Water Resource Report 54

1982

GROUNDWATER RESOURCES OF THE JUNIATA RIVER BASIN, PENNSYLVANIA

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OFFICE OF RESOURCES MANAGEMENT
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
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PREPARED IN COOPERATION WITH
SUSQUEHANNA RIVER BASIN COMMISSION

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Aerial view looking southeast from the vicinity of Mexico, Pennsylvania. The Juniata River valley and Tuscarora Mountain are in the foreground, Wildcat and Raccoon Ridges cross the center of the photo, and Buffalo Mountain, Berry Mountain, Half Falls Mountain, Peters Mountain, and Blue Mountain lie beyond. The Great Valley is seen in the distance, and the rocks of the Triassic Lowlands form the horizon. The village of Thompsontown is in the foreground, and Millerstown and Newport are visible near the center of the photo. Photo is from *Geology Illustrated*, by John S. Shelton, courtesy of W. H. Freeman and Company, copyright © 1966. (Caption is from Faill and Wells, 1974.)

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ABSTRACT

The Juniata River basin has abundant water resources resulting from an average annual precipitation of 37 inches. Streamflow represents about 40 to 46 percent of precipitation, or about 15 to 17 inches. Approximately 66 percent of streamflow is supplied by groundwater, either by flow from springs or by direct seepage to streambeds.

Groundwater use in the Juniata River basin was about 26 million gallons per day in 1970. By 1990, total water use is projected to increase by about 28 percent, most of which will come from groundwater. Even with this increase, only a small fraction of the available groundwater resource will be utilized.

The aquifers in the basin are a thick sequence of folded sedimentary rocks consisting chiefly of sandstone, siltstone, shale, and limestone. Sandstone generally forms the ridges because of its resistance to weathering, whereas nonresistant limestone and shale primarily underlie valleys.

Groundwater levels are at a median depth of 15 feet in valleys, 37 feet under hillsides, and 66 feet under hilltops. Bedrock units that consist primarily of shale have the shallowest median water levels: 10, 30, and 45 feet for valley, hillside, and hilltop locations, respectively.

Lithology, topography, and geologic structure influence the depth, size, and abundance of water-bearing zones and therefore influence the yields of wells that intercept these zones. Rock units that consist predominantly of limestone and dolomite have the highest well yields, followed by sandstone and shale in that order.

Yields of valley wells are two to three times higher than yields of wells located in other topographic settings. Geologic structures that have a significant influence on well yields include faults, folds, fractures, and attitude of bedding planes.

Groundwater quality is generally adequate for most uses. The most troublesome natural constituents in groundwater are iron and manganese. More than 35 percent of the analyzed samples from wells had objectionable amounts of one or both of these elements.

Major types of groundwater contamination in the basin are bacterial organisms from sewage, petroleum products from buried storage tanks, ni-

trates from agricultural activities and septic tanks, landfill leachate, and acid mine drainage.

INTRODUCTION

PURPOSE AND SCOPE

The investigation on which this report is based was performed as a part of the three-year Special Groundwater Study of the Susquehanna River Basin by the Susquehanna River Basin Commission in cooperation with the Pennsylvania and U. S. Geological Surveys. The Pennsylvania Survey will publish a series of four reports describing the groundwater resources of the Susquehanna River basin in Pennsylvania; this report on the Juniata River basin is the first of that series.

The intent of these studies is to provide up-to-date information on the quantity and quality of groundwater within the report areas to assist in the proper development and utilization of the resource. The study also provides baseline information necessary for basin-wide management of groundwater.

LOCATION AND DESCRIPTION OF THE AREA

The Juniata River drains an area of about 3,404 square miles in south-central Pennsylvania. All or most of Blair, Huntingdon, Juniata, and Mifflin Counties, along with parts of Bedford, Centre, Fulton, Perry, and Somerset Counties, are included in the drainage basin (Figure 1).

Much of the area is mountainous, consisting of a series of northeast-southwest-trending ridges and valleys. Farming, the predominant economic activity, is scattered throughout the valleys. Altoona and Lewistown are the only centers of population having more than 10,000 people, although many small towns dot the area. Table 1 lists the present and projected basin population by county of this primarily rural region. The preponderance of forest lands and agriculture over other land uses within the basin is clearly shown in Figure 2; approximately 91 percent of the land surface is in these use categories.

ACKNOWLEDGEMENTS

The writers are grateful to the many well owners who allowed their wells to be tested or sampled. The U.S. Geological Survey, the Susquehanna River Basin Commission, and the Bureau of Laboratories within the Pennsylvania Department of Environmental Resources provided valuable input and data to the project.

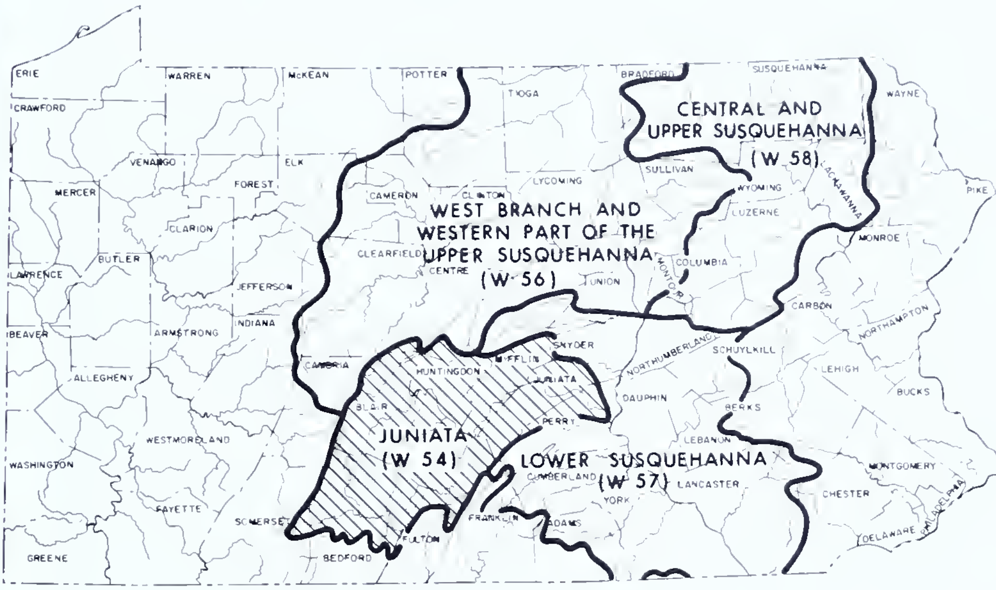


Figure 1. Map showing the location of the Pennsylvania portion of the Susquehanna River basin, the Juniata River basin, and the three additional report areas.

Table 1. ***Population Totals by County for the Juniata River Basin***[1]
(modified from Pennsylvania Department of Environmental Resources, 1979, 1980)

County	Existing 1970	Projected 1980	Projected 1990
Blair	135,492	135,295	143,691
Huntingdon	39,192	40,686	42,896
Bedford	42,447	42,223	45,182
Perry	28,681	29,660	31,864
Juniata	16,732	17,419	18,612
Mifflin	45,369	48,437	53,610
TOTALS	307,913	313,720	335,855

[1] Totals for Centre, Fulton, and Somerset Counties are not included because of the small land area that they occupy in this basin.

Water-quality information in the Broad Top area was provided by the Broad Top Study Group, Eric Groft, Coordinator. John Stephenson of the Department of Environmental Resources assisted in identifying ground-water contamination within the basin.

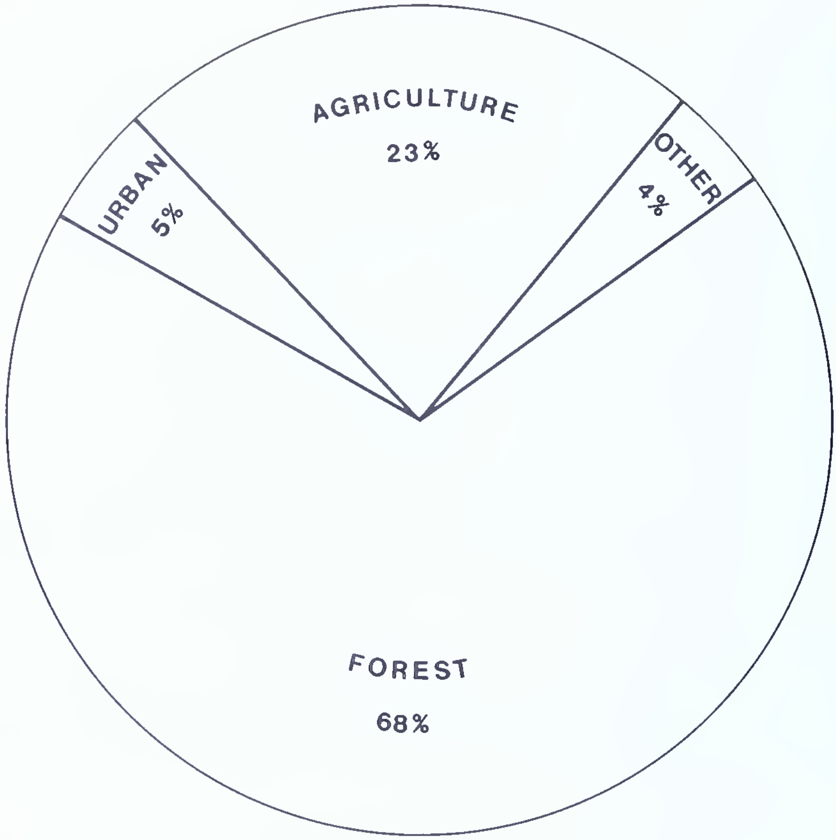


Figure 2. Percent land use by category, 1970.

WATER USE

Total water use in the Juniata River basin was estimated in the Pennsylvania Department of Environmental Resources State Water Plan (1979, 1980) to be about 175 mgd (million gallons per day) in 1970. Approximately 85 million gallons of this daily total, however, was used by power plants expected to be phased out by 1990.

About 28 percent of the remaining 90 mgd water use is from groundwater. Industry is the largest user of groundwater, followed by domestic and public supply in that order (Table 2). Figure 3 shows diagrammatically the relative proportions of groundwater use by category. The major users of groundwater have been listed in Table 3, *Public Water Suppliers Utilizing Groundwater*, and Table 4, *Industries Using More than 100,000 Gallons per Day of Groundwater*.

State Water Plan projections are for a 28 percent increase in public and domestic supplies by 1990; most of this increase will undoubtedly be supplied by groundwater. Smaller increases are projected for the other use

Table 2. ***Water Use in the Juniata River Basin***

(modified from Pennsylvania Department of Environmental Resources (1979, 1980); quantities are in millions of gallons per day)

Type of use	Groundwater withdrawal	Surface-water withdrawal	Total withdrawal	Projected total use 1980	Projected total use 1990
Public supply	4.1	20.5	24.6	25.9	31.3
Domestic supply	6.0	0.0	6.0	6.9	7.8
Industrial	10.7	27.0	37.7	28.3	27.3
Mineral	.3	10.0	10.3	13.1	15.9
Agricultural[1]	3.6	6.4	10.0	10.9	11.8
Golf course	.5	.5	1.0	1.1	1.2
Institutional	.4	0.0	.4	.4	.5
TOTALS	25.6	64.4	90.0	86.6	95.8

[1] Includes irrigation, which is difficult to estimate and varies considerably from year to year depending upon precipitation. Although the State Water Plan (Pennsylvania Department of Environmental Resources, 1979, 1980) projects more than a 500 percent increase in irrigation by 1990, the amount in this table is held constant because of the above-mentioned difficulty in making estimates and to accentuate changes in the other use categories.

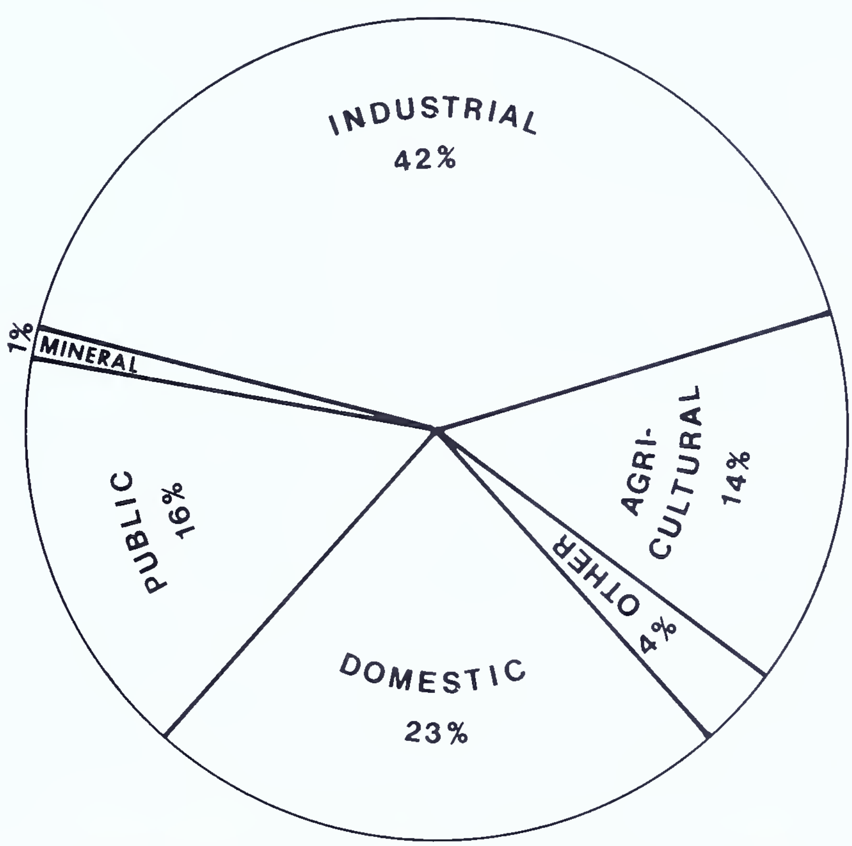


Figure 3. Percent groundwater use by category, 1970.

Table 3. *Public Water Suppliers Utilizing Groundwater*

County	Water supplier	Sources
Bedford	Bedford Borough Water Authority	Reservoirs; 1 spring
	Coaldale/Six Mile Run Water Corporation	2 wells (Bd-457, -458)
	Defiance Water System	4 springs
	Everett Municipal Authority	2 wells (Bd-449, -450); 1 spring
	Fishertown Water Association	2 wells (Bd-466, -467); 1 spring
	New Enterprise Water Company	1 well (Bd-459)
	Osterburg Water Company	1 well (Bd-468)
	Pleasantville Water Authority	1 well (Bd-472)
	Rainsburg Water Authority	1 spring
	St. Clairsville Water Company	2 springs
	Salemville Water Association	2 springs
	Waterside-Loysburg Water System	3 springs; 1 well (Bd-463)
	Woodbury Borough Water Company	2 wells (Bd-464, -475); 3 springs
Blair	Curryville Water Authority	2 wells (Ba-338, -339)
	Duncansville Municipal Authority	1 well (Ba-340)
	East Sharpsburg Water Association	3 springs
	Fredricksburg Water Authority	1 spring, unnamed mountain stream
	General Refractories Company—Claysburg	2 wells (Ba-346, -347); 1 spring
	General Refractories Company—Sproul	2 wells (Ba-342, -343)
	Greenfield Park Water Company	1 spring (Indian Spring)
	Martinsburg Borough	7 wells (Ba-329, -330, -331, -332, -333, -336, -337)
	Roaring Spring Borough	1 spring (Roaring Spring); unnamed mountain stream
	Williamsburg Water Department	2 wells (Ba-344, -345); 3 reservoirs
	R. C. Burket Water Company, Inc. (Newry Borough)	1 spring
Centre	Cedar Hill Water Company	2 wells (Ce-179, -180)
	Oak Ridge Authority	2 springs
	Rock Spring Water Company	1 well (Ce-213); Schalls Gap Run
	Upper Half Moon Water Company	2 wells (Ce-210, -211)
Fulton	Wells Tannery Water Supply	1 spring (Wells Tannery Spring)
Huntingdon	Alexandria Borough	2 wells (Hu-107, -108)
	Blairs Mills Water Works	1 spring
	Broad Top City Water Authority	1 well (Hu-260)
	Cassville Water Company	1 spring
	Dudley-Barnettstown Water Association	1 well (Hu-342)
	Orbisonia Water Company	3 springs; 1 well (Hu-251)
	Petersburg Water Works	2 wells (Hu-9, -254)
	Saltillo Borough Water Works	4 springs; 1 well (Hu-237)
	Shirleysburg Municipal Authority	1 well (Hu-260)
	Three Springs Borough Water Commission	4 springs
	Valley Rural Electric Cooperative, Inc.	1 well (no data)

Table 3. *(Continued)*

County	Water supplier	Sources
Huntingdon	Warriors Mark Water Company	1 well (Hu-256)
Juniata	McAlisterville Water Company	2 wells (Ju-22, -73); 2 springs
	Port Royal Municipality Authority	5 wells (Ju-74, -75, -76, -96, -97); Yocum Run
	Richfield Area Joint Authority	2 wells (outside basin); 3 springs
	Thompsontown Municipality Authority	2 wells (Ju-81, -82); Water Cress Spring
Mifflin	Allensville Municipal Authority	1 spring
	McVeytown Borough Authority	3 wells (Mf-267, -268, -271)
	Menno-O-Mutual Water Company	1 spring
	Municipal Authority of Union Township	3 wells (Mf-149, -230, -232)
Perry	Millerstown Borough Water Works	4 springs; 2 wells (Pe-610, -663)
	Newport Borough Water Authority	1 well (Pe-37); Howes Run

Table 4. *Industries Using More than 100,000 Gallons per Day of Groundwater*

County	Company	Sources
Blair	Appleton Paper Div.—NCR, Roaring Spring	1 spring
	Small Tube Products, Inc., Altoona	2 wells (Ba-377, -378)
	United States Envelope Co., Williamsburg	1 spring
	Westvaco Corp., Tyrone	3 springs
Juniata	Empire Kosher Poultry, Inc., Mifflintown	7 wells (Ju-361, -362, -363, -364, -365, -367, -369)
Mifflin	Abbotts Dairies, Belleville	2 wells (Mf-338, -339)

categories. However, a trend toward a higher percentage use of groundwater rather than surface water is expected in all categories because of limitations placed upon the use of surface water during low-flow periods.

Mineral extraction and processing sites are reported to utilize a relatively small fraction of the total groundwater withdrawn from the basin, although eight sites were identified that had surface and groundwater withdrawals in excess of 100,000 gallons per day. Figure 4 shows the locations of active quarries and pits as of 1976. Many of the excavations shown on the map do not intercept the water table and thus have minimal impact on the groundwater. Table 5 is a list of the active quarries and pits, keyed to the map numbers in Figure 4.

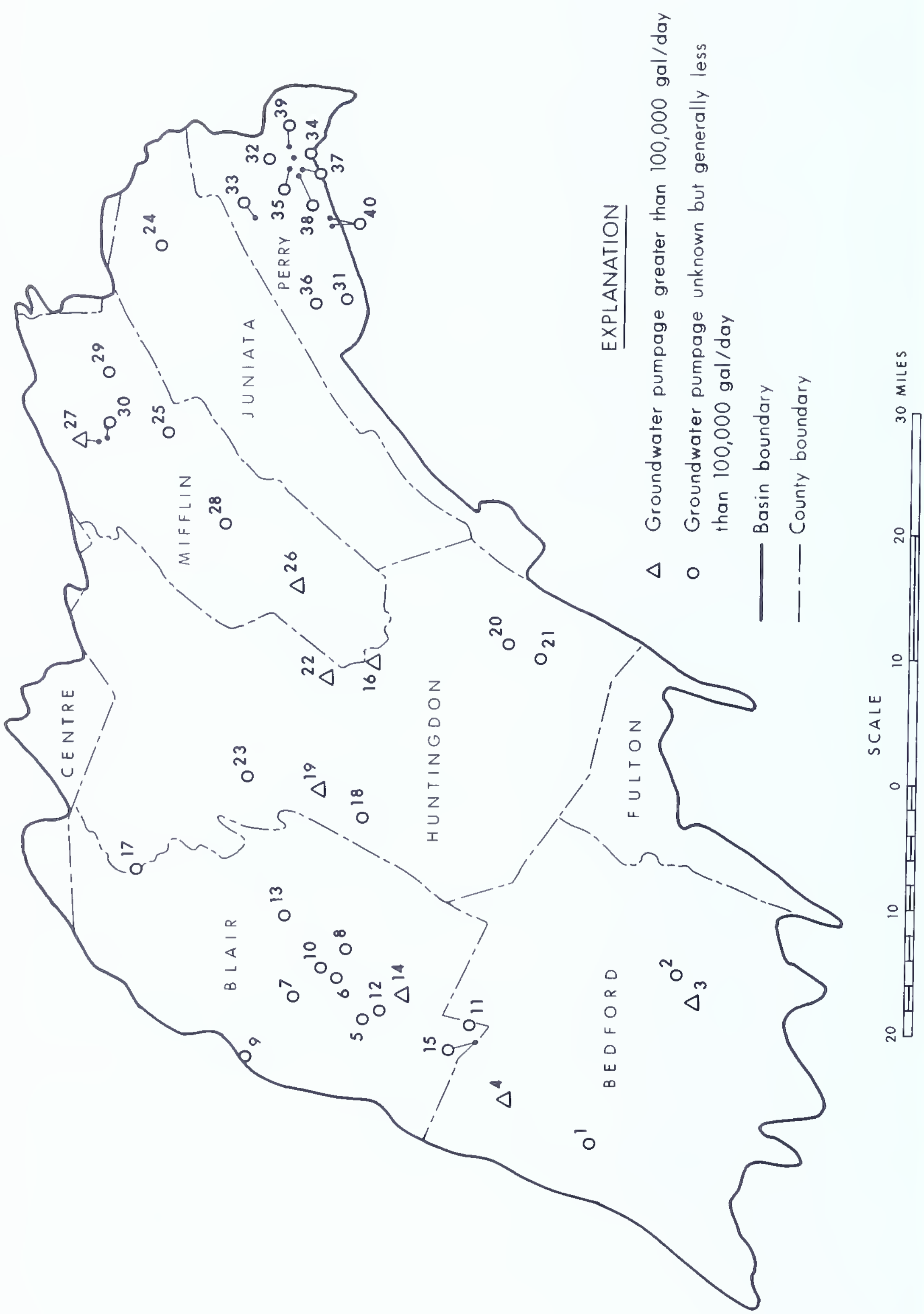


Figure 4. Active quarries and pits in the Juniata River basin, 1976.

Table 5. *Active Quarries and Pits, Juniata River Basin*

County	Map no.	Producer	Type or name of operation	Product(s)
Bedford	1	Bedford County Stone and Lime Co.	New Paris quarry	Carbonate raw material for cement
	2	Feight Bros.	Open pit	Crushed and broken stone
	3	New Enterprise Stone and Lime Co., Inc.	Ashcom quarry	Agricultural stone; carbonate aggregate; filter stone; lime; rock dust (carbonate) for coal mines
	4	New Enterprise Stone and Lime Co., Inc.	Weymart quarry	Crushed and broken stone
Blair	5	Russell C. Burket	Open pit	Shale for fill and road building
	6	Chimney Rocks Lime and Stone Co.	Blair Township quarry	Carbonate aggregate
	7	Eldorado Stone Co.	Ellenberger quarry	Carbonate aggregate
	8	Frankstown Sand Supply	Open pit	Sand
	9	Garfield Refractories Co.	Fire clay strip mine	Refractories
	10	Grannas Bros. Stone and Asphalt Co., Inc.	Hollidaysburg quarry	Carbonate aggregate
	11	J. L. Hartman	Sarah Furnace quarry	Crushed and broken stone
	12	Charles L. Lingenfelter	Open pit	Shale for fill and road building
	13	New Enterprise Stone and Lime Co., Inc.	Canoe Creek quarry	Carbonate aggregate; filter stone
	14	New Enterprise Stone and Lime Co., Inc	Roaring Springs quarry	Agricultural stone; carbonate aggregate; filter stone
	15	Sproul Lime and Stone Co.	Sproul quarry	Agricultural stone
Huntingdon	16	Harbison-Walker Refractories Co. Division of Dresser Industries, Inc.	Mt. Union quarry	Crushed and broken stone
	17	Narehood Bros. Co., Inc.	Tyrone Forge quarry	Agricultural stone; carbonate aggregate
	18	New Enterprise Stone and Lime Co., Inc.	Hesston quarry	Agricultural stone; carbonate aggregate
	19	New Enterprise Stone and Lime Co., Inc.	McConnelstown quarry	Agricultural stone; carbonate aggregate

Table 5. *(Continued)*

County	Map no.	Producer	Type or name of operation	Product(s)
Huntingdon	20	New Enterprise Stone and Lime Co., Inc.	Orbisonia quarry	Agricultural stone; carbonate aggregate
	21	Parsons Stone and Lime Co.	Shade Gap quarry and mill	Carbonate aggregate
	22	Pennsylvania Glass Sand Corp.	Keystone quarry	Sand and gravel
	23	Resco Products, Inc. (Alexandria Fire Clay Div.)	Open pit	Refractories
Juniata	24	Juniata Limestone Co.	Fayette Township quarry	Agricultural stone; carbonate aggregate
Mifflin	25	Derry Limestone Co., Inc.	Lewistown quarry	Carbonate aggregate
	26	Faylor-Middlecreek, Inc.	McVeytown quarry	Carbonate aggregate
	27	Faylor-Middlecreek, Inc.	Naginey quarry	Carbonate aggregate
	28	Faylor-Middlecreek, Inc.	Strodes Mills (pit and plant)	Sand
	29	General Paving and Construction, Inc.	Belltown quarry	Carbonate aggregate
	30	Honey Creek Lime Co.	Shrader quarry and plant	Lime
Perry	31	H. T. Baughman Construction Co.	Open pit	Shale for fill and road building
	32	Chester E. Bowser	Open pit	Crushed or broken stone
	33	Russell J. Campbell	Open pit	Shale for fill and road building
	34	Harry F. Fahnestock	Open pit	Crushed or broken stone
	35	Four-Forty-One Corp.	Newport quarry	Crushed or broken stone
	36	Fultz Bros., Inc.	Open pit	Shale for fill or road building
	37	Harry B. Lesh	Open pit 1	Shale for fill and road building
	38	Harry B. Lesh	Open pit 2	Shale for fill and road building
	39	J. Harold Stydinger	Open pit	Crushed or broken stone
	40	G. R. Thebes	Open pits	Shale for fill and road building

HYDROLOGY

The groundwater resources of an area can be properly utilized and managed only when the occurrence and interrelationship of water in the atmosphere and on the land surface, in addition to the water in the subsurface, are described and quantified. This interrelationship is collectively called the hydrologic cycle and is shown diagrammatically in Figure 5.

The diagram shows that essentially all of the water in the Juniata River basin enters as precipitation, and leaves as either water vapor to the atmosphere (evapotranspiration), surface runoff, or groundwater discharge to streams. Average annual amounts shown in the diagram are approximations and are not intended for use in detailed planning. A detailed discussion of the amount and variation of the components in the cycle is given in the sections that follow.

WATER BUDGETS

A water budget is a quantitative expression of the major components of the hydrologic cycle. The water budget balances the water that enters the

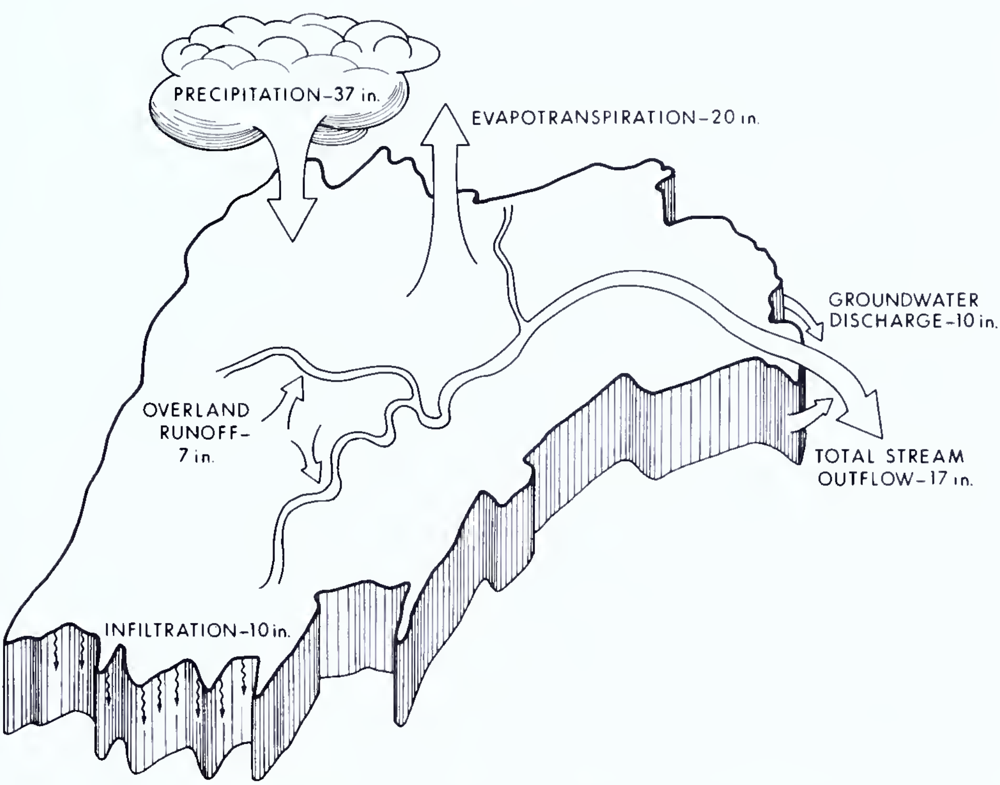


Figure 5. The annual hydrologic cycle and water budget for the Juniata River basin.

basin as precipitation with the water that leaves the basin as evapotranspiration and streamflow. A simplified equation expressing this balance is:

$$P = R_g + R_s + ET + \Delta S$$

where

P = precipitation

R_g = groundwater discharge to streams

R_s = surface or direct runoff

ET = water lost by evaporation and transpiration

ΔS = change in amount of water in storage

($R_g + R_s$ = total streamflow)

Water budgets were prepared for the entire river basin and four smaller basin areas for the water years 1945, 1947, 1949, 1953, and 1958 (Table 6). Recognizing the difficulty in obtaining uniform conditions throughout such a large basin, three of the years were selected to obtain information for near normal precipitation conditions (1949, 1953, and 1958). For years having much-above-normal precipitation and much-below-normal precipitation, information was obtained from 1945 and 1947, respectively. Two additional criteria were used to select the years analyzed: (1) streamflow at the beginning and at the end of the water year had to be nearly the same to minimize changes in storage, and (2) the years were prior to the regulation of low flows by the Raystown Dam.

For comparison purposes, long-term average values for precipitation, total runoff, and evapotranspiration are given for those basins having sufficient records.

PRECIPITATION (P)

Records of precipitation from the weather station that was either within or most representative of a particular basin were used in the water budget analysis. These data were also used to prepare a map showing average annual precipitation within the Juniata River basin (Figure 6). Average annual precipitation ranges from about 35 inches in the central part of the area to about 40 inches in the east and west; the weighted average for the whole basin is about 37 inches.

Use of average annual precipitation for water resource planning, however, can be somewhat misleading. Figure 7 is a bar graph showing annual precipitation totals at Mapleton Depot in Huntingdon County, which is centrally located within the basin. The number of years that had above or below normal precipitation are approximately evenly divided (20 above and 19 below), but less than half (15) are within 10 percent of the mean. Much of the precipitation that is in excess of normal is rapidly lost to overland runoff and streamflow and only a small amount can be stored for dry years. Thus the usable water resource approaches the mean for those years having precipitation that is near normal and above, which occur about 70 percent

Table 6. *Water Budgets for Major Stream Basins*

Water year	Precipitation P (inches)	=	Surface runoff R_s (inches)	+	Groundwater discharge R_g (inches)	+	Evapotranspiration ET (inches)
			JUNIATA RIVER AT NEWPORT				
1945	44.2	=	7.2	+	10.0	+	27.0
1947	32.0	=	4.6	+	8.4	+	19.0
1949	42.8	=	5.3	+	10.5	+	27.0
1953	39.7	=	8.5	+	11.4	+	19.8
1958	43.4	=	5.7	+	9.9	+	27.8
Long-term Av.				*Total runoff (inches)*			
(1941-1970)	36.3	=		15.5		+	20.8
			JUNIATA RIVER AT HUNTINGDON				
1945	44.2	=	7.7	+	11.7	+	24.8
1947	29.6	=	4.7	+	9.8	+	15.1
1949	38.8	=	4.7	+	11.7	+	22.4
1953	37.4	=	6.6	+	14.1	+	16.7
1958	36.7	=	5.1	+	10.7	+	20.9
Long-term Av.				*Total runoff (inches)*			
(1941-1970)	34.9	=		16.8		+	18.1
			RAYSTOWN BRANCH, JUNIATA RIVER AT SAXTON				
1945	42.0	=	7.2	+	9.0	+	25.8
1947	27.7	=	3.4	+	6.9	+	17.4
1949	42.2	=	5.2	+	11.2	+	25.8
1953	43.0	=	7.6	+	11.6	+	23.8
1958	42.5	=	5.8	+	10.0	+	26.7
Long-term Av.				*Total runoff (inches)*			
(1941-1970)	36.2	=		14.6		+	21.6

Table 6. *(Continued)*

Water year	Precipitation P (inches)	=	Surface runoff R_s (inches)	+	Groundwater discharge R_g (inches)	+	Evapotranspiration ET (inches)
			KISHACOQUILLAS CREEK AT REEDSVILLE				
1945	45.9	=	4.2	+	13.2	+	28.5
1947	32.7	=	3.6	+	13.7	+	15.4
1949	39.8	=	4.7	+	12.0	+	23.1
1953	39.5	=	5.3	+	16.4	+	17.8
1958	41.1	=	3.7	+	13.9	+	23.5
Long-term Av. (1941-1970)	37.8	=	*Total runoff (inches)* 16.9			+	20.9
			TUSCARORA CREEK AT PORT ROYAL				
1945	45.9	=	6.0	+	8.9	+	31.0
1947	32.7	=	4.5	+	7.8	+	20.4
1949	39.8	=	5.7	+	10.3	+	23.8
1953	39.5	=	8.1	+	12.4	+	19.0
1958	41.1	=	6.0	+	9.1	+	26.0

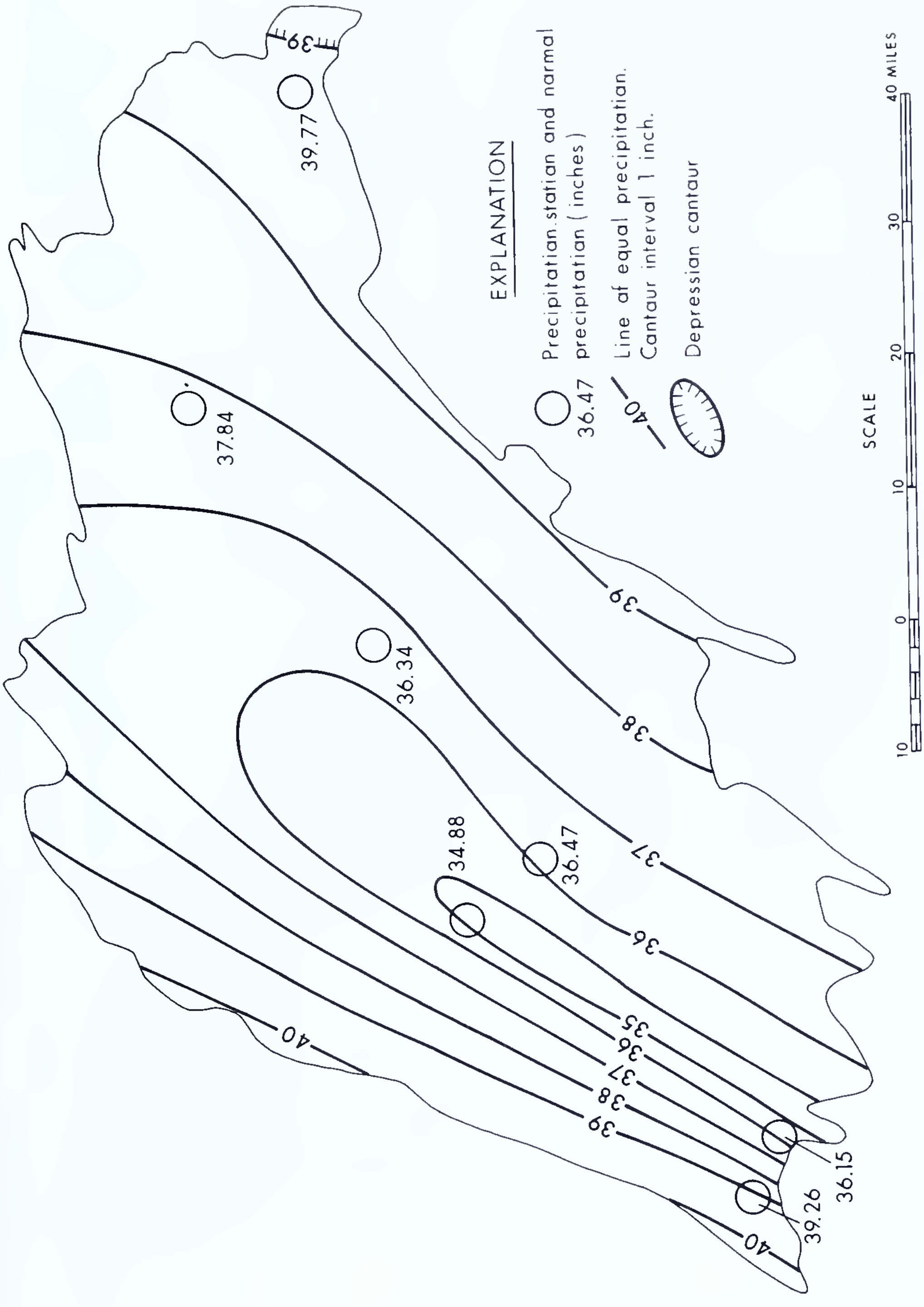


Figure 6. Average annual precipitation in the Juniata River basin (based on data from U. S. Weather Bureau, 1941-1970).

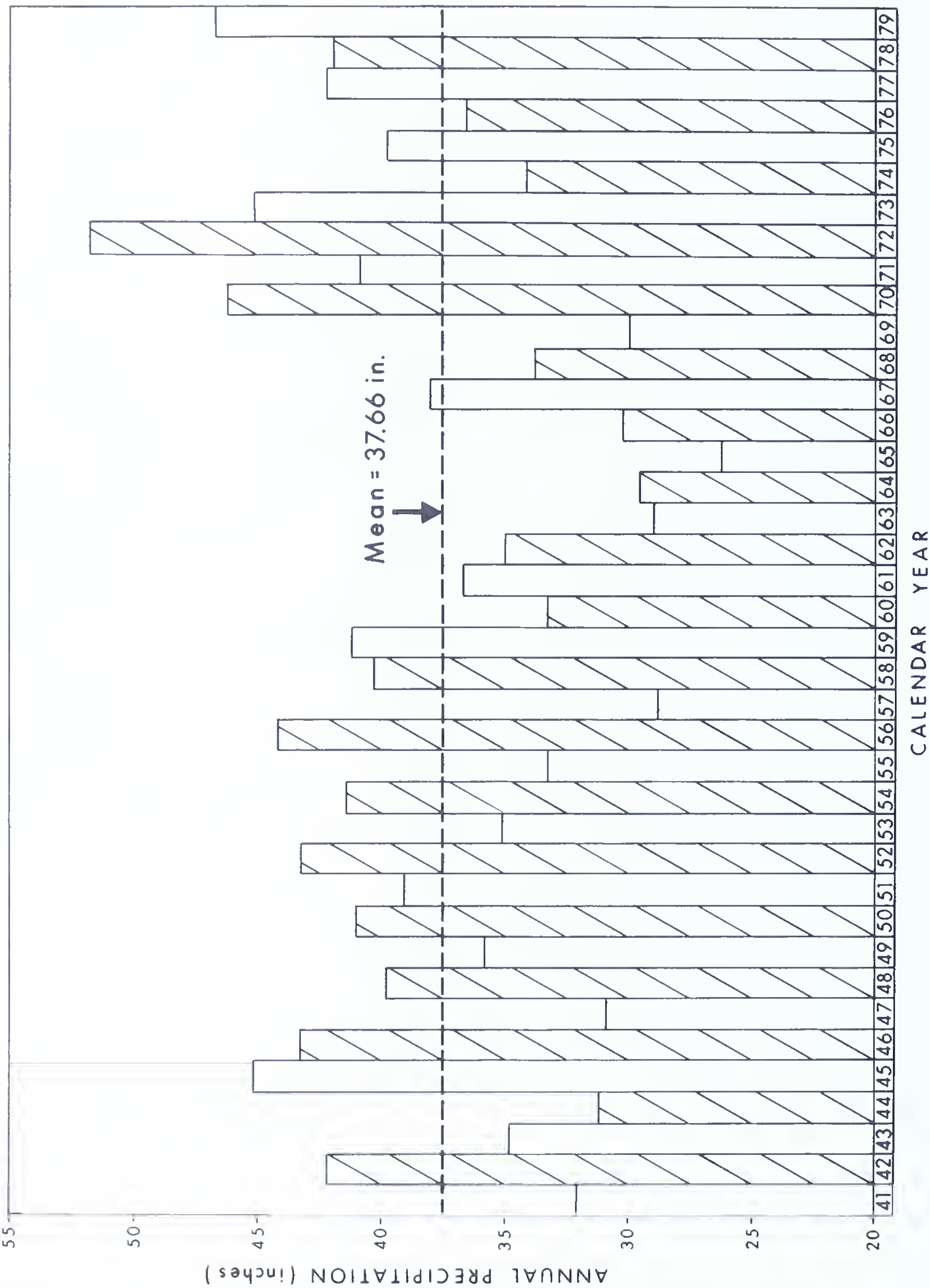


Figure 7. Annual precipitation at Mapleton Depot, Huntingdon County.

of the time. During the remaining years there is considerably less water available. This suggests that if water resource planning were based on mean precipitation, water shortages could be expected approximately 30 percent of the time.

A frequency plot of annual precipitation is a somewhat more useful tool for analyzing the availability of water (Figure 8). For example, about 20 percent of the time, precipitation at Mapleton Depot is equal to or less than 32 inches (the 1947 precipitation for the Juniata River at Newport). This is equivalent to a 5-year recurrence interval, which is the interval at which, on the average, a water budget of similar magnitude to that of 1947 might be expected to occur.

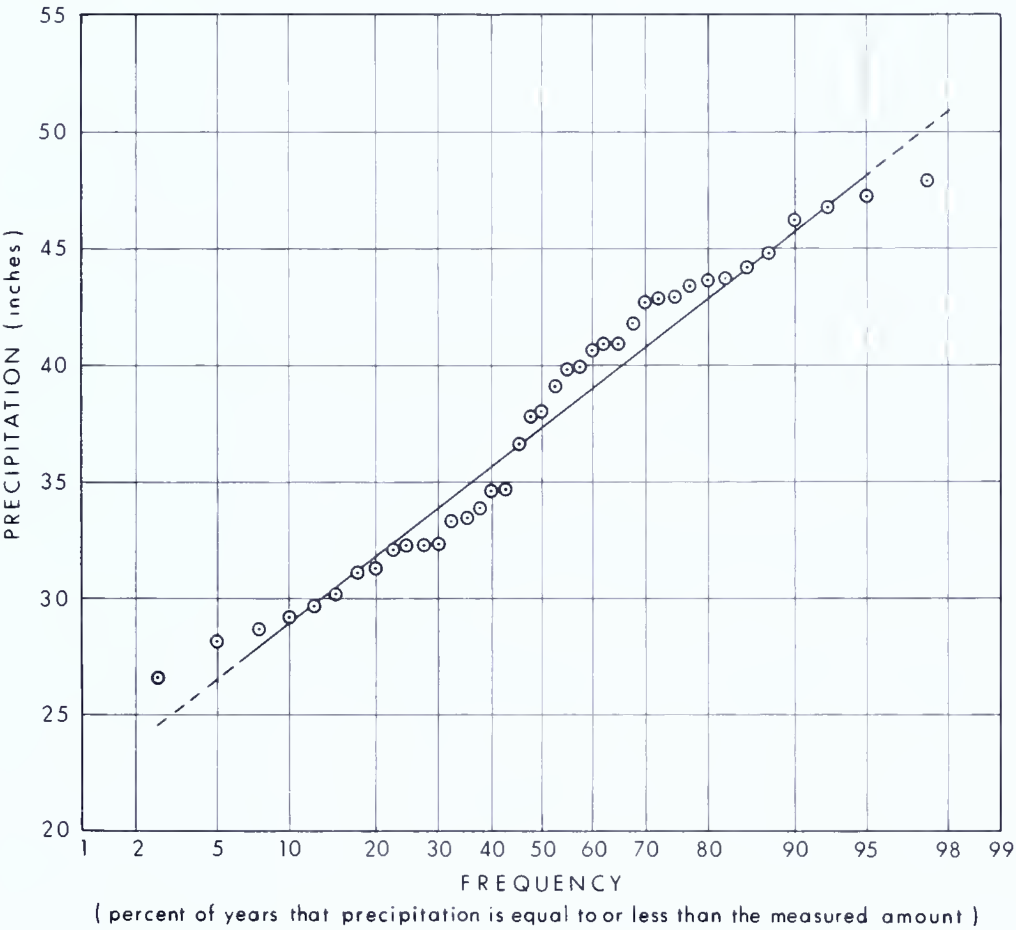


Figure 8. Frequency plot of annual precipitation at Mapleton Depot, Huntingdon County, for the period 1941-1979.

STREAMFLOW ($R_g + R_s$)

Streamflow was obtained from the records of the U. S. Geological Survey for the five gaging stations listed in Table 6. The gage at Newport was

selected because it measures streamflow from nearly all of the basin. Flow from the northwestern and southern parts of the basin is measured at Huntingdon and Saxton, respectively. The gages at Reedsville and Port Royal were selected because they measure flow from areas almost entirely underlain by carbonate and noncarbonate rocks, in that order. The groundwater and surface-water components of streamflow were separated on hydrographs.

On the average, total runoff accounts for about 40 to 48 percent of annual precipitation, or 14.6 to 16.9 inches (one inch of precipitation per year on one square mile is roughly equal to 17.4 million gallons). During the wet year analyzed (1945), baseflow averaged about 62 percent of total streamflow, and during the dry year (1947) the average was approximately 67 percent. The average for the normal years was 66 percent.

Groundwater constitutes a greater percentage of streamflow in carbonate rocks than in other rock types. This is demonstrated by data from Kishacoquillas Creek, a substantial part of which is underlain by carbonate rocks, where baseflow averaged 76 percent of streamflow. This can be contrasted to Tuscarora Creek, which is underlain by very little carbonate rock and where baseflow averaged only 61 percent of streamflow.

Figure 9 is a frequency plot of annual runoff as measured at the Newport gage. Such a plot is useful in predicting the probability of occurrence of annual flows. For example, the plot shows that 10 percent of the years during the 39-year period of record had streamflows that were 10.5 inches or less. From this it can be predicted that streamflow will be 10.5 inches or less on the average of one of ten years. Obviously, a longer historical record would provide a more accurate prediction.

A frequency plot of annual baseflow was made by correlating the data in Table 6 and the total runoff plot. The small number of data points limits the utility of the graph. However, it appears that annual baseflows of less than 7.5 inches (approximately 250 (gal/min)/mi^2 [gallons per minute per square mile]) can be expected about 10 percent of the time.

EVAPOTRANSPIRATION (ET)

Evapotranspiration is a collective term for (1) evaporation from water bodies, wetted surfaces, and moist soil by direct evaporation, and (2) vapor that escapes from living plants by the process of transpiration. The amount of ET varies with the length of the growing season, average temperature, amount, intensity, and timing of precipitation events, and humidity. Consumptive losses to ET are at a minimum between the first killing frost in the fall and the active resumption of plant growth in the spring. Most of the recharge to the groundwater system occurs during this time period, as shown in Figure 10.

The amount of water lost to ET in the basin was estimated by computing the difference between precipitation and streamflow for the long-term

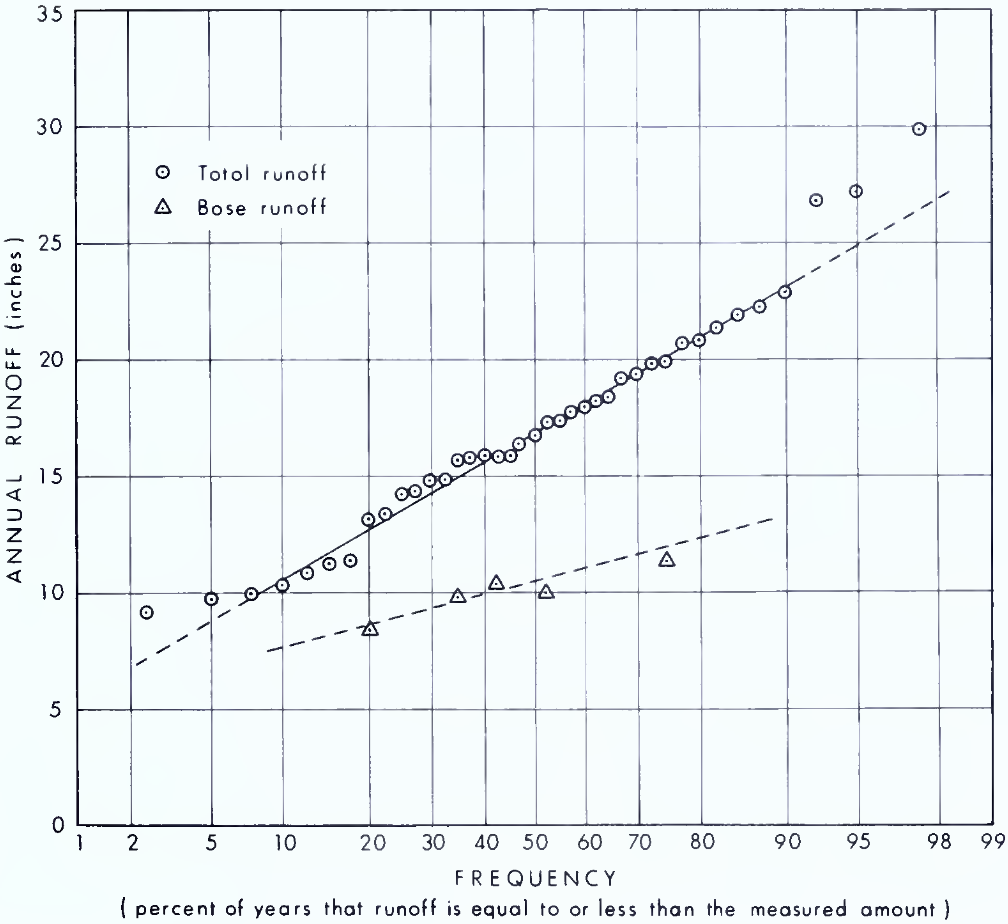


Figure 9. Frequency plot of annual runoff from the Juniata River at Newport for the period 1941-1979.

budget periods. In the entire basin, ET averages 20.8 inches, or about 57 percent of precipitation. The computed average ET for smaller areas ranges between 18.1 and 20.9 inches.

ESTIMATE OF AREAL AVAILABILITY OF GROUNDWATER

Baseflow data can be used to calculate the average groundwater discharge per unit of land surface. This is a practical estimate of the limits of development for a basin or aquifer. Long-term groundwater withdrawals in excess of the average discharge can cause a progressive lowering of water levels and severely reduce the flow of streams.

Groundwater discharges from the entire basin ranged between 280 and 380 (gal/min)/mi^2, whereas discharges from the basin primarily underlain by carbonate rocks ranged between about 400 and 540 (gal/min)/mi^2. These values represent the range of discharges that would be expected to occur approximately 60 percent of the time; about half of the remaining years have either higher or lower discharges.

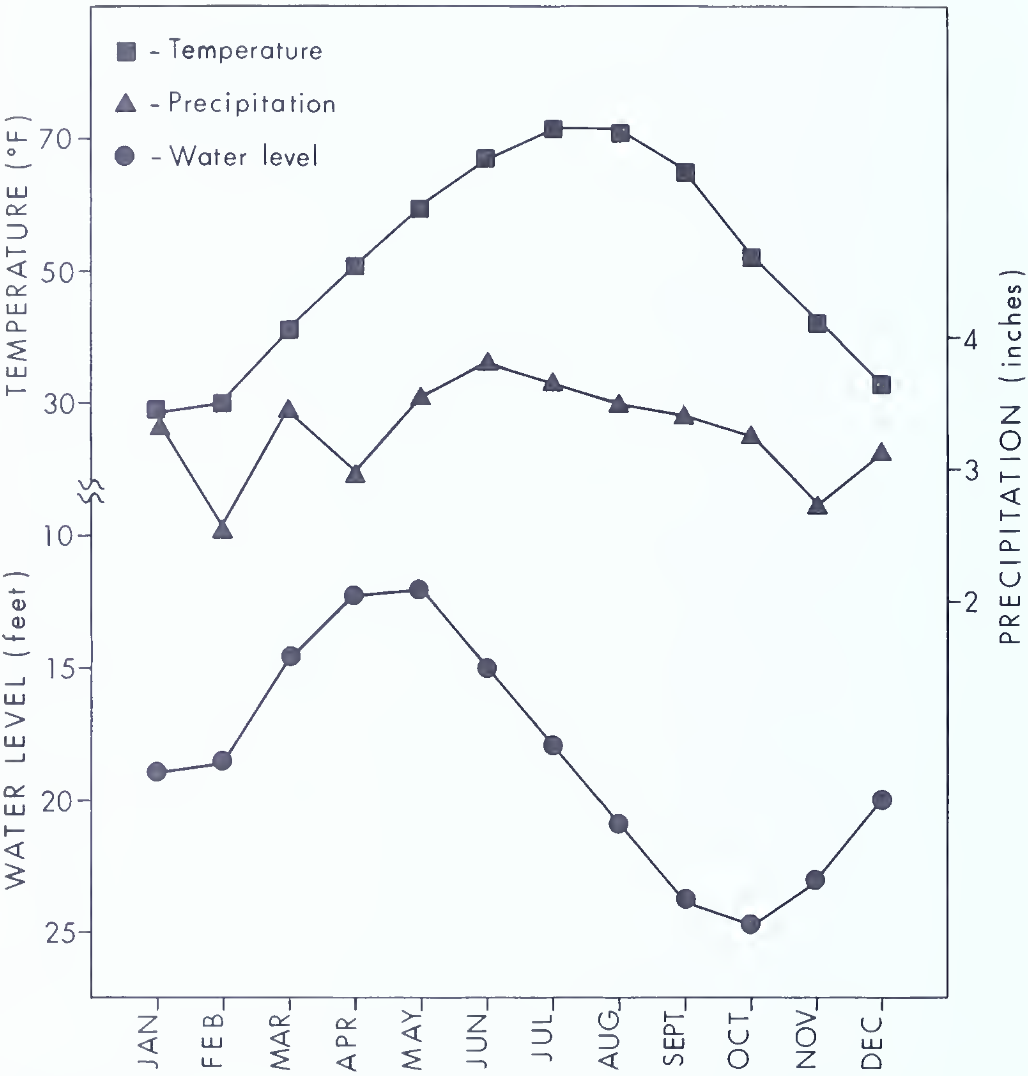


Figure 10. Mean monthly temperature and precipitation at Kegg, and mean water level in well Bd-150 (1965-1979).

HYDROGEOLOGY

GEOLOGIC SETTING

Most of the Juniata River basin lies within the Appalachian Mountain section of the Valley and Ridge physiographic province. The topography in this province is characterized by a northeast-southwest-trending succession of narrow, steep-sided ridges and valleys. A very small part of the basin is in the Appalachian Plateaus physiographic province, which consists of a flat upland area that is deeply dissected by many steep-walled, narrow valleys.

The basin is underlain by a thick sequence of sedimentary rocks consisting chiefly of sandstone, siltstone, shale, and limestone. Minor amounts of

coal are present in the Broad Top and Plateaus areas. The sequence consists chiefly of a lower calcareous unit overlain by three alternating noncalcareous and calcareous units that were deposited more or less continuously from the Cambrian (520± million years ago) through Pennsylvanian Periods (300± million years ago).

Near the end of the Paleozoic Era the long period of subsidence and sedimentation ended with the onset of regional tectonic (mountain-building) forces that caused the rock layers to be folded and in some places faulted. Erosion of these large folds produced the existing series of ridges and valleys. The ridges are predominantly underlain by sandstone, which is more resistant to weathering than the valley-forming limestone and shale.

OCCURRENCE AND MOVEMENT OF GROUNDWATER

The portion of precipitation that does not run off or is not lost through evapotranspiration infiltrates the soil and moves downward through the soil and rock until it reaches the water table, below which all the interconnected voids are filled with water. After reaching this saturated zone, the water moves slowly downward and laterally toward lower altitudes (or lower hydraulic potential) and eventually returns to the land surface, either from springs or from channel seepage, to provide the base flow to streams.

The water table fluctuates according to the relative amounts of recharge to and discharge from the groundwater system. Figure 10 shows the mean monthly temperature and precipitation measured at Kegg in Bedford County. The groundwater levels shown are from an observation well near Kegg. Although the mean precipitation is more or less uniformly distributed throughout the year, most recharge occurs after the spring thaw and before the onset of vigorous plant growth in May, and after the first killing frost in October and before the ground freezes in late December. During the summer there is normally a steady decline in groundwater levels because large evapotranspiration losses allow very little recharge to reach the saturated zone. Thus the seasonal variation in precipitation is more critical to the groundwater resource than the annual total. A dry spring or fall may have considerable effect, whereas a dry summer probably would have much less impact on the resource. A hydrograph of the Juniata County observation well for the period 1968 to 1980 (Figure 11) is included to show minor fluctuations in the annual pattern of water levels.

Most field data indicate that the water table forms a subdued replica of the land surface, so that water levels under hills are at higher altitudes than those in valleys. Water levels measured in the Juniata River basin have a median depth of 15 feet in valleys (333 wells), 37 feet under hillsides (547 wells), and 66 feet under hilltops (89 wells). Bedrock units that consist primarily of shale have the shallowest median water levels. For example, the combined Brallier and Harrell Formations have median water levels of 10,

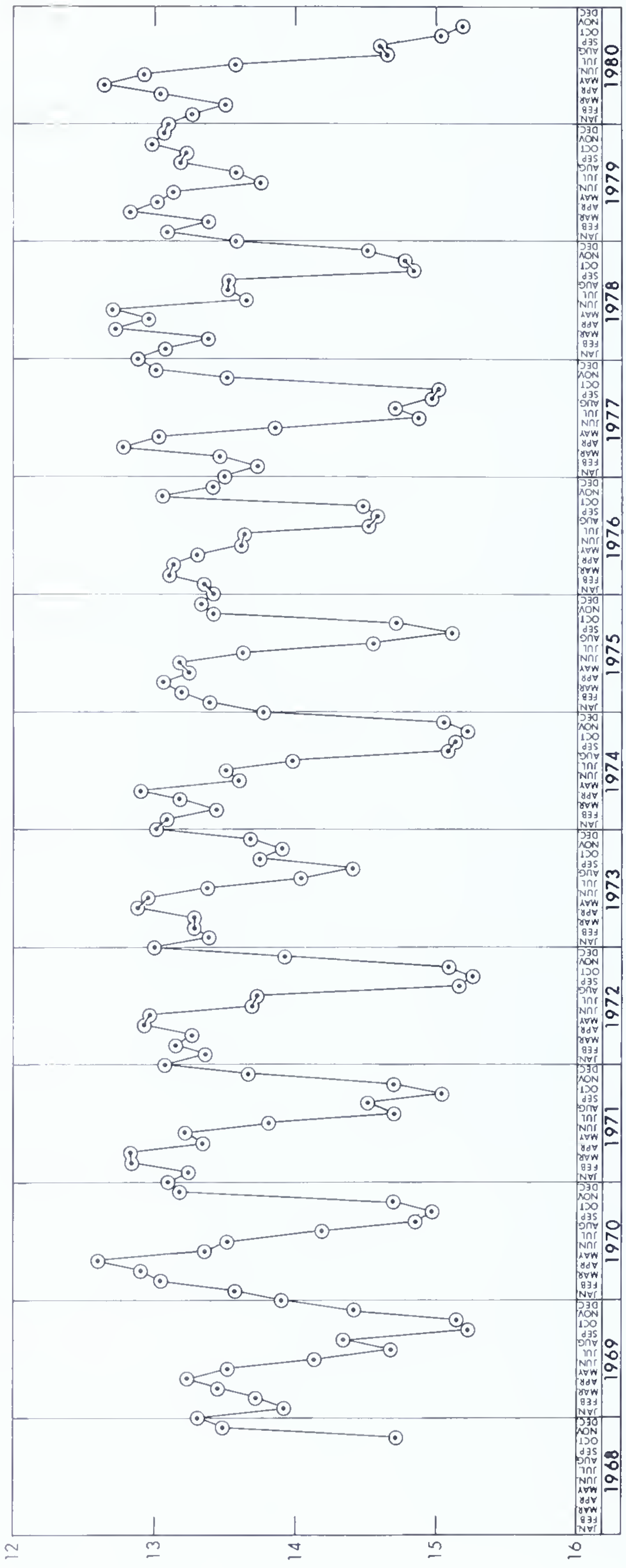


Figure 11. Hydrograph of well Ju-351 for the period 1968-1980.

30, and 45 feet for valley, hillside, and hilltop locations, respectively. High-permeability rock units such as limestone and some sandstone generally have the deepest water levels.

FACTORS THAT INFLUENCE THE YIELDS OF WELLS

The yield of a well depends largely on the size, number, distribution, and degree of interconnection of the water-filled openings penetrated by the well. These openings or water-bearing zones may be fractures, bedding-plane partings, or small voids between the grains that comprise the rock.

Table 7 summarizes data available on water-bearing zones for the report area. The deepest reported zone for each rock unit is also listed. In the table, the denominator of the fraction indicates the number of wells penetrating a particular depth range. The denominator of the shallowest range obviously indicates the total number of wells in that formation for which data on depth to water-bearing zones were obtained. Thus, data were obtained for 43 wells in the Mauch Chunk Formation. The value (or magnitude) of the fraction gives the relative abundance of zones with depth. In the Mauch Chunk, zones were most abundant in the 51- to 100-foot interval. The data given in the table for the shallowest interval (0 to 50 feet) are somewhat misleading because the casing length and static water level were not taken into account. However, the data do indicate the abundance of usable zones in that interval.

Geologic factors that control the type and distribution of water-bearing zones, and thus well yields, are described in the following three sections.

Lithology

Rock type is more important than any other factor in determining well yield, because the occurrence of both primary and secondary porosity and permeability varies according to lithology.

Lithologic factors that control development of secondary openings consist of rock susceptibility to solution, rock susceptibility to fracturing, and the presence and spacing of bedding-plane partings.

Different types of rock respond differently to the various natural stresses placed upon them. Layers of sandstone or dolomite most generally fail by brittle fracture when stressed, whereas limestone or shale layers tend to flow. Thus fractures are generally more abundant in the former two rock types.

Enlargement of primary and secondary openings by solution occurs mainly in the carbonate rocks—limestone and dolomite. In a few instances, however, the permeability of sandstones has been increased by the solution removal of calcite cement from the constituent grains. The Ridgeley Member of the Old Port Formation provides a good example of this type of solution.

Table 7. *Summary of Data on Water-Bearing Zones*

Group, formation, or member	Ratio of number of water-bearing zones of specified depth range to number of wells penetrating this range											
	Depth range (in feet)											Deepest zone
	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500	
Conemaugh Group	5/5	2/4	0/1	0/1	0/1	1/1	1/1					335
Allegheny Group	2/5	3/4	1/3	1/1								175
Mauch Chunk Formation	23/43	41/40	13/21	13/15	3/11	2/9	1/4					328
Pocono Formation	5/11	11/10	5/7	2/3	1/1	0/1	1/1					320
Rockwell Formation	2/1	0/1										70
Catskill Formation[1]	25/127	57/125	72/115	53/85	33/60	11/34	9/23	4/13	0/6	2/6	3/5	560
Irish Valley Member of Catskill Formation	12/31	30/31	19/16	2/4								220
Lock Haven Formation	4/12	10/11	4/6	1/4	1/3	1/2						285
Foreknobs Formation	23/44	42/41	23/28	13/15	2/5	3/4	0/1					300

Scherr Formation	15/33	31/31	14/21	5/10	1/6	1/4	0/2	0/1	0/1	0/1	0/1	343
Trimmers Rock Formation	7/35	20/32	15/28	15/18	6/14	2/8	2/5	0/1				335
Brallier and Harrell Formations, undivided	54/95	60/84	23/59	14/40	6/25	9/21	4/13	1/8	0/4	1/3	0/1	457
Mahantango Formation	47/79	62/60	24/38	14/22	5/11	1/6	2/3	1/1	0/1	0/1		388
Marcellus Formation	20/43	9/37	12/9	2/4	1/2	2/2						300
Hamilton Group	43/78	48/69	30/47	19/37	8/23	5/16	3/7	0/5	0/3	2/2	1/1	635
Onondaga Formation	8/22	12/17	3/12	4/9	4/6	2/3	1/1	0/1	0/1			355
Old Port Formation	7/26	6/24	8/20	6/15	6/11	3/4	0/2	0/2	2/2	0/1		460
Onondaga and Old Port Formations, undivided	8/35	17/33	9/24	10/14	4/12	6/10	0/4	0/2				302
Keyser and Tonoloway Formations, undivided	35/88	45/81	43/59	26/40	10/18	5/9	2/5	1/2	1/1	0/1		470
Wills Creek Formation	95/117	89/95	36/46	10/21	6/11	2/8	0/2	0/2	0/2	0/1	0/1	300

Table 7. *(Continued)*

Group, formation, or member	Ratio of number of water-bearing zones of specified depth range to number of wells penetrating this range											
	Depth range (in feet)											Deepest zone
	0–50	51–100	101–150	151–200	201–250	251–300	301–350	351–400	401–450	451–500	>500	
Bloomsburg Formation	23/35	20/28	3/10	8/9	3/5	0/1	0/1	0/1				240
Mifflintown Formation	3/6	5/5	1/2	2/2	0/1	0/1	0/1	0/1				190
Bloomsburg and Mifflintown Formations, undivided	7/19	13/18	6/12	3/9	3/7	4/5	0/1	1/1				385
Clinton Group	8/27	12/24	11/20	10/16	3/10	4/6	2/3					335
Tuscarora Formation	3/3	0/2	0/1	1/1	1/1							240
Juniata Formation	0/1	0/1	0/1	1/1								160
Bald Eagle Formation	2/3	1/3	1/3	1/2	0/1	1/1	1/1					315
Reedsville Formation	16/29	23/23	16/15	4/7	0/4	0/3	1/2	0/2	0/2			350
Coburn Formation through Nealmont Formation, undivided	2/5	1/5	5/4	1/3	3/3	0/1						240

Coburn Formation through Loysburg Formation, undivided	14/18	10/17	1/12	6/9	3/6	0/3	1/2	1/2				390
Bellefonte Formation	4/11	6/11	1/8	3/6	2/6	2/4	1/1	1/1				365
Axemann Formation	0/1	0/1	2/1									118
Bellefonte and Axemann Formations, undivided	2/18	8/16	6/13	7/11	2/6	1/5	1/4	0/1	1/1	0/1		433
Nittany and Stonehenge/Larke Formations, undivided	6/30	10/28	19/25	8/15	8/11	5/6	2/4	0/1				280
Beekmantown Group	0/2	1/2	0/1	1/1								177
Gatesburg Formation	1/34	9/34	13/32	8/25	8/24	7/16	4/13	2/6	4/4	0/1	0/1	436
Warrior Formation	1/6	1/6	4/6	2/5	2/2	2/1	0/1					317
Pleasant Hill Formation	0/1	1/1										85
Waynesboro Formation	0/1	1/1	0/1									98

[1] Includes Catskill Formation, undivided (Dck on Plate 1), and Duncannon, Sherman Creek, and Irish Valley Members of Catskill Formation (Dcd, Dcsc, and Dciv on Plate 1). Irish Valley Member is also listed separately.

Figure 12 is a graph showing the percent frequency distribution of nondomestic well yields that have been grouped according to dominant rock types. The importance of lithology is apparent; yields from the carbonate rock types are consistently higher than those from either the interbedded sandstone and shale or the comparatively low yielding shale.

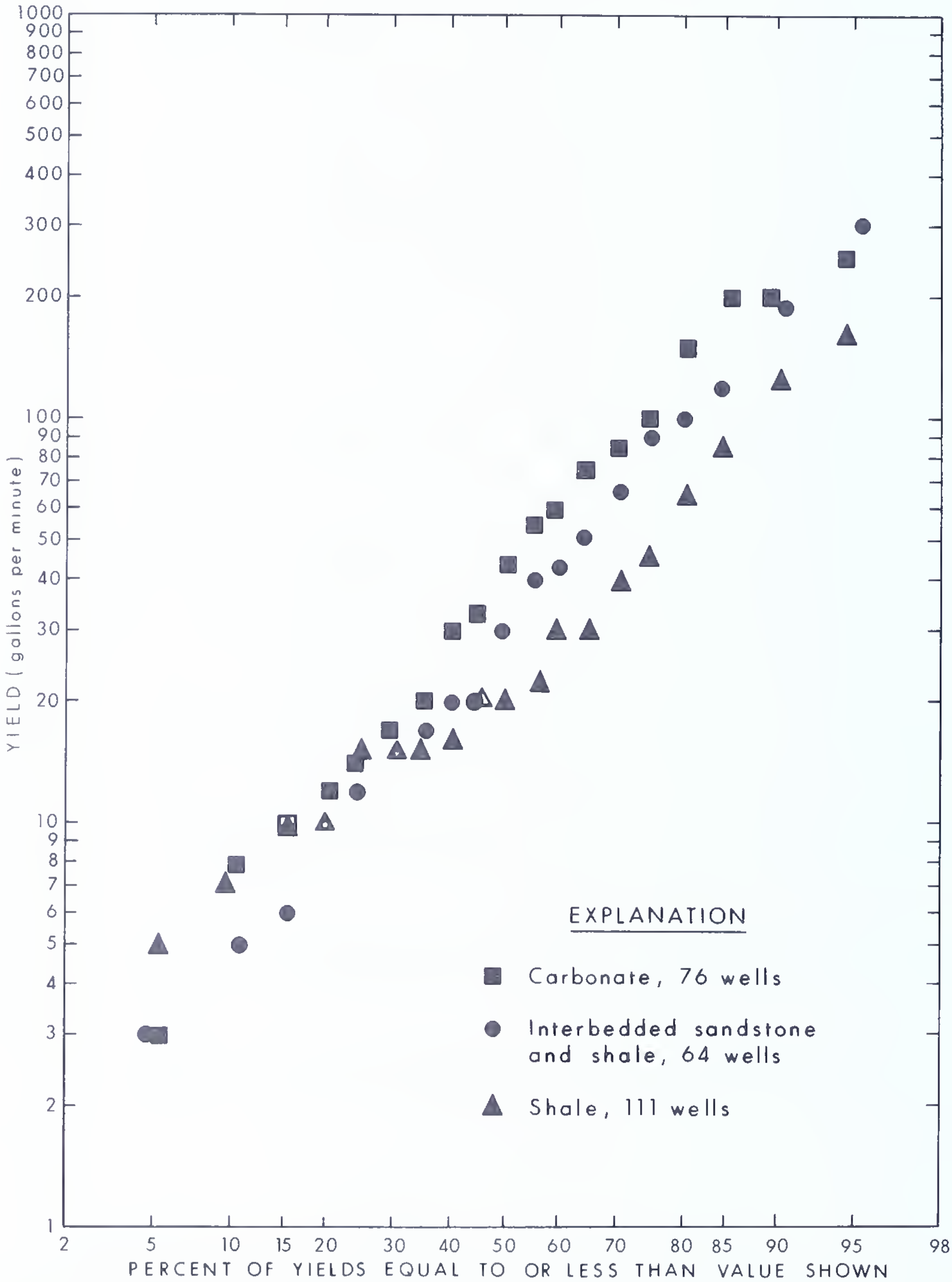


Figure 12. Percent frequency distribution of nondomestic well yields, grouped according to dominant rock type.

Topography

Many studies (Meisler and Becher, 1971; Wood and others, 1972; Becher and Taylor, in press) have evaluated the relationship of topography and well yield. All have found a significant relationship between topographic position of the well and well yield, the wells in higher topographic positions (hilltops and hillsides) having smaller yields than those in lower topographic positions (valleys and gullies or draws).

Valleys or draws often form where the rocks are most susceptible to physical or chemical weathering, and hilltops are generally underlain by more resistant rocks. In addition to lithologic variations, zones of weakness in rocks such as bedding partings, joints, cleavage, and faults are often weathered to produce low areas in the topography.

Figure 13 is a graph showing the percent frequency distribution of non-domestic well yields that have been grouped according to topographic position. The graph shows that in the lower yield range (less than 20 gal/min), valley wells are about twice as productive as hillside and hilltop wells. In the higher yield range, valley wells are nearly three times as productive as in the other settings. The lack of graphical separation between wells in hillside and hilltop locations can probably be explained by the small number of wells in the hilltop category.

Geologic Structure

Geologic structure, which includes faults, folds, fractures, and orientation of the rock layers (bedrock dip), often has an important influence on the yield of wells. The locations of major structures are shown on Plate 1.

Faulting may create openings that yield substantial amounts of water. Occasionally, however, faults may be filled with clay, calcite, or quartz and may yield little or no water, especially faults in carbonate rocks.

In the vicinity of fold hinges, considerable secondary permeability may be developed because of a reported increase in fracture abundance, occasional well-developed cleavage, and the presence of horizontal or nearly horizontal bedding near the fold hinges.

Wells that penetrate fractured bedrock will yield more water than those that do not penetrate any fractures. Valleys and depressions are frequently localized along fractures or fracture zones; thus wells in these settings have a high probability of penetrating fractured bedrock. Other features that are reported to be good indicators of fractured bedrock are faults and fracture traces (natural linear features observed on aerial photographs that may be the surface expressions of fractured bedrock).

Well yields generally increase with decreasing dip of strata because more of the openings that normally occur along bedding (bedding-plane partings) are penetrated by a well in nearly horizontal strata than in steeply inclined strata.

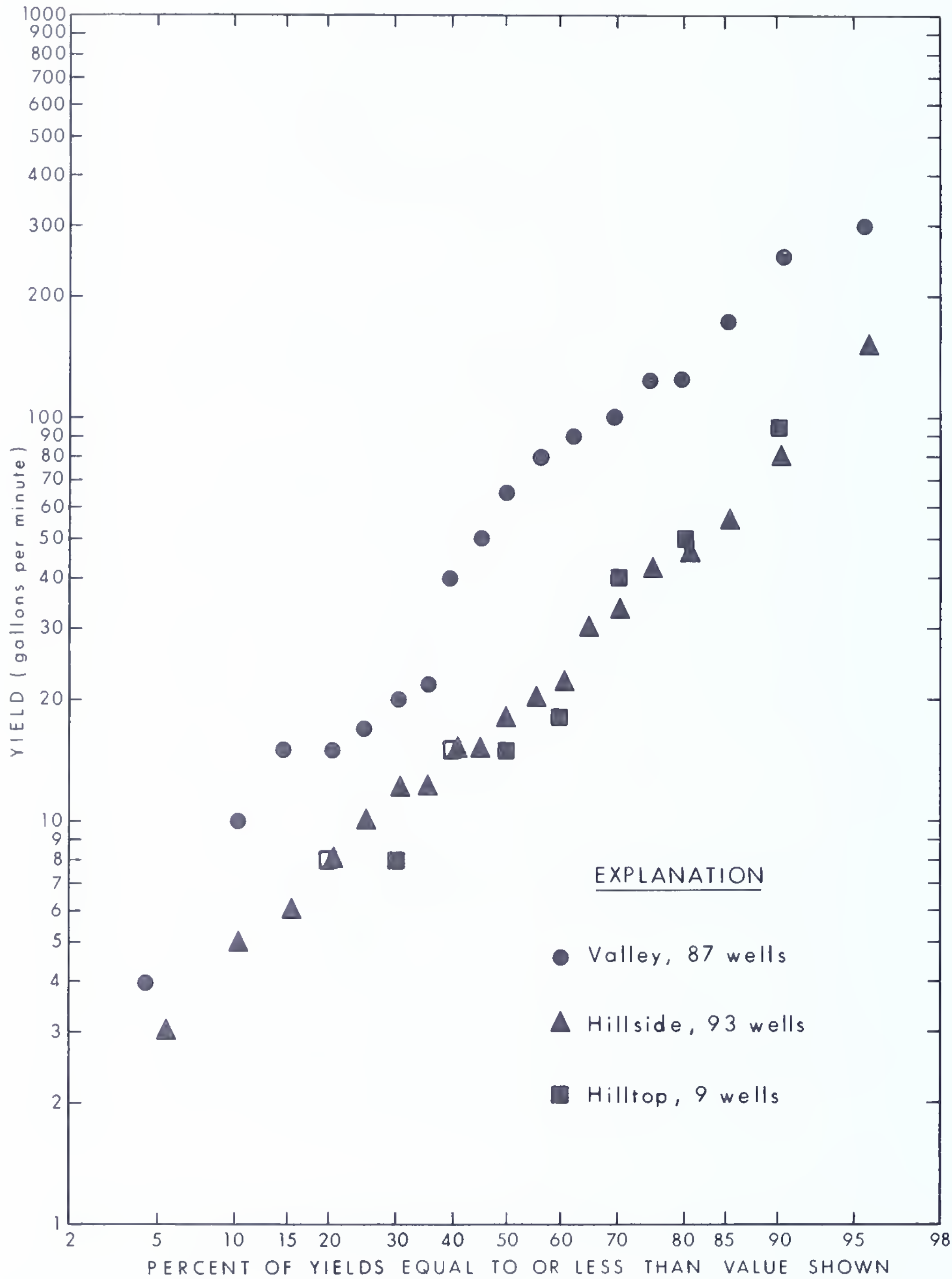


Figure 13. Percent frequency distribution of nondomestic well yields, grouped according to topographic position.

GROUNDWATER QUALITY

The amount and type of dissolved mineral matter found in groundwater are determined largely by the composition of the soil and rock through

which the water flows and the occurrence of the water within the groundwater flow system. Table 8 lists the source and significance of principal mineral constituents that were detected in the groundwater.

In order to evaluate the groundwater quality within the Juniata River basin, 164 water samples were collected from wells and springs and analyzed in the laboratory of the Department of Environmental Resources. The results of these analyses are listed in Table 15 and summarized by aquifer in Table 9.

The major observed differences in the chemistry of water from the various rock units occur between water from primarily calcareous units and water from primarily noncalcareous units. Table 10 summarizes the analyses according to dominant rock type.

The median hardness from units composed mainly of limestone and/or calcareous shale is 200 mg/L as compared to a median of only 89 mg/L for water from units composed predominantly of noncalcareous shale, siltstone, and sandstone. The highest concentrations of iron generally occur in the noncalcareous units, as evidenced by their median iron concentration of 0.14 mg/L as compared to a median of 0.04 mg/L for calcareous units.

Additional information on hardness, specific conductance, and pH was obtained from the 874 field analyses summarized in Table 11. These and other common constituents in groundwater are described in the following sections. The overall chemical character of groundwater from individual aquifers is described in the section entitled "Stratigraphy and Water-Bearing Properties of the Rocks."

SPECIFIC CONDUCTANCE AND TOTAL DISSOLVED SOLIDS

The specific conductance of a water depends on the amount and nature of its dissolved solids. The relationship of laboratory measurements of dissolved solids to field measurements of specific conductance is shown in Figure 14. Although there appears to be considerable scatter in the data plotted on the graph, they correlate reasonably well, and the approximate dissolved-solids content of the groundwater can be obtained by multiplying the specific conductance by 0.65 and adding 8.3.

The maximum recommended limit for dissolved solids in drinking water is 500 mg/L (U. S. Environmental Protection Agency, 1975), which is equivalent to a specific conductance of about 780 micromhos. Slightly less than 5 percent of the water samples had a specific conductance of 780 or more, and most of these were from rocks composed mainly of limestone or calcareous shale.

HARDNESS

Hardness in water is a measure of its resistance to sudsing and is primarily caused by the presence of calcium and magnesium ions. The field measure-

Table 8. *Source and Significance of Selected Dissolved Constituents and Properties of Groundwater*[1]

(Concentrations are in milligrams per liter (mg/L) except as indicated)

Constituent or property	Source or cause	Significance
Arsenic (As)	Widely distributed; generally occurs in compounds that have a low solubility in water. May be added to water supplies through waste disposal and is present in certain insecticides and herbicides.	Toxic to mammals and aquatic species; also reported to be carcinogenic. Maximum recommended limits for arsenic are 0.05 mg/L for domestic water supplies and 0.10 mg/L for irrigation water.[2]
Aluminum (Al)	Abundant and widely distributed in rocks and soils.	Rarely occurs in natural water in concentrations greater than a few tenths of a milligram per liter. No reported detrimental effects.
Cadmium (Cd)	Relatively rare in rocks and soils. Metal plating, storage battery manufacture, and numerous other industrial processes have released cadmium into both surface and groundwaters.	Toxic to almost all body systems; can produce hypertension, kidney disease, pulmonary edema and osteomalacia. Maximum limit recommended for drinking water is 0.01 mg/L.[2]
Chromium (Cr)	Abundant element in the earth but not generally present in high concentrations in natural waters. Presence of high concentrations is mostly related to industrial wastes.	The trivalent state is the most common found in nature, and is an essential trace element for mammals. The hexavalent state is the one found most commonly in industrial processes; this form is a systemic poison and is corrosive. Maximum limit recommended for drinking water is 0.05 mg/L.[2]
Lead (Pb)	Lead has a low solubility, so it is generally not found in high concentrations in natural waters. The most common source is lead pipes in older plumbing systems, especially in waters that have a low pH. Also occurs in aragonite, replacing calcium, and in feldspar, replacing potassium.	Toxic to almost all body systems. Inhibits formation of hemoglobin and leads to symptoms of anemia. Accumulates in bones and soft tissues, causing kidney damage and neurological symptoms in advanced cases. Known to cause mental retardation, cerebral palsy, and optic nerve atrophy in children.
Magnesium (Mg)	Widely distributed in all rocks and soils, particularly in dolomite.	No reported detrimental effects.
Nickel (Ni)	Naturally occurring in all rocks, though in low concentrations.	Apparently nontoxic to humans.

Zinc (Zn)	Widely distributed in rocks and soils but in small quantities, except where concentrated in ore bodies. May also dissolve from galvanized pipes and may be present in industrial wastes.	Necessary trace element for human metabolism. Deficiency can result in stunted growth and poor healing of wounds. Can be toxic when ingested in large quantities; causes gastrointestinal distress. Maximum recommended limit for drinking water is 5.0 mg/L.[2]
Silica (SiO_2)	Dissolved from practically all rocks and soils (commonly less than 30 mg/L).	Forms hard scale in pipes and boilers. When carried over in steam of high-pressure boilers it forms deposits on blades of turbines.
Iron (Fe)	Dissolved from practically all rocks and soils. May also be derived from iron pipes, pumps, and other equipment.	On exposure to air, iron in groundwater oxidizes to a reddish-brown precipitate. More than about 0.3 mg/L stains laundry, porcelain, and utensils reddish brown. Objectionable for food processing, textile processing, beverages, ice manufacturing, brewing, and other processes. Maximum limit recommended for drinking water is 0.3 mg/L.[2]
Manganese (Mn)	Dissolved from many rocks and soils. Often found associated with iron in natural waters but is not as common as iron.	More than 0.2 mg/L precipitates upon oxidation. Manganese has the same undesirable characteristics as iron but is more difficult to remove. Maximum limit recommended for drinking water is 0.05 mg/L.[2]
Calcium (Ca) and magnesium (Mg)	Dissolved from practically all rocks and soils, especially from limestone, dolomite, and gypsum.	Cause of most of the hardness, and in combination with bicarbonate is the cause of scale formation in steam boilers, water heaters, and pipes (see hardness). Water low in calcium and magnesium is desired in electroplating, tanning, dyeing, and in textile manufacturing.
Sodium (Na) and potassium (K)	Dissolved from practically all rocks and soils. Sewage and industrial wastes are also major sources.	Concentrations of less than 50 mg/L have little effect on the usefulness of water for most purposes. More than 50 mg/L may cause foaming in steam boilers.
Bicarbonate (HCO_3) and carbonate (CO_3)	The bicarbonate ion may result from atmospheric carbon dioxide and the solution of carbon dioxide produced during the decomposition of organic matter in the soil. The major source, however, is from the solution of limestone.	Bicarbonate and carbonate produce alkalinity. Bicarbonates of calcium and magnesium decompose in steam boilers and hot-water facilities to form scale and release corrosive carbon dioxide gas (see hardness).

Table 8. *(Continued)*

Constituent or property	Source or cause	Significance
Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds. Commonly present in some industrial wastes and sewage.	Sulfates in water containing calcium may form hard calcium sulfate scale in steam boilers. Maximum limit recommended for drinking water is 250 mg/L.[2]
Chloride (Cl)	Dissolved from rocks and soils in small quantities. Relatively large amounts are derived from sewage, industrial wastes, and highway salting practices.	In large quantities chloride increases the corrosiveness of water. Large amounts in combination with sodium will give a salty taste. Maximum limit recommended for drinking water is 250 mg/L.[2]
Fluoride (F)	Dissolved in small to minute quantities from most rocks and soils.	About 1.0 mg/L of fluoride in drinking water is believed to be helpful in reducing the incidence of tooth decay in small children; larger concentrations cause mottling of enamel. It is recommended that fluoride not exceed 1.7 mg/L where the 5-year average of daily maximum air temperature is 53.0 to 53.7 °F.[2]
Nitrate (NO_3)	Decaying organic matter, sewage, and fertilizers are principal sources.	Small concentrations have no effect on usefulness of water. Most groundwaters contain less than 10 mg/L. Waters containing more than 45 mg/L may cause methoglobinemia (a disease often fatal in infants) and, therefore, should not be used in infant feeding. Maximum limit recommended for drinking water is 45 mg/L.[2]
Hardness (as $CaCO_3$)	In most waters nearly all of the hardness is due to calcium and magnesium. All of the metallic cations other than the alkali metals also cause hardness. There are two classes of hardness—carbonate (temporary) and noncarbonate (permanent). Carbonate hardness refers to the hardness resulting from cations in association with carbonate and bicarbonate; it is called temporary because it may be removed by boiling the water. Noncarbonate hardness refers to that resulting from cations in association with other anions.	Hardness consumes soap before a lather will form and deposits soap curds on bathtubs. Carbonate hardness is the cause of scale formation in boilers, water heaters, radiators, and pipes, causing a decrease in heat transfer and restricted flow of water. Waters of hardness up to 60 mg/L are considered soft; 61 to 120 mg/L, moderately hard; 121 to 180 mg/L, hard; and more than 180 mg/L, very hard. Milligrams per liter divided by 17.1 yields the concentration in grains per gallon.

Dissolved solids—A measure of all the chemical constituents dissolved in a particular water. The maximum limit recommended for drinking water is 500 mg/L, but water containing up to 1,000 mg/L may be used where less mineralized supplies are not available.[1]

Specific conductance (micromhos at 25 °C)—A measure of the capacity of a water to conduct an electrical current. It varies with concentration and degree of ionization of the constituents. May be used to obtain a rapid estimate of the approximate dissolved-solids content of water.

pH—The negative logarithm of the hydrogen-ion concentration. A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote alkaline solutions; values lower than 7.0 indicate acidic solutions. Corrosiveness of water generally increases with decreasing pH. The pH of most natural waters ranges between 6 and 8.

Temperature—The temperature of groundwater that occurs between the water table and about 60 feet below the water table is approximately the same as the average annual air temperature (Lovering and Goode, 1963, p. 5); below this point, groundwater temperatures increase with depth about 1 °F for each 50 to 100 feet.

[1] After Lloyd and Growitz (1977), p. 51-54.

[2] U. S. Environmental Protection Agency (1976), *Quality Criteria for Water*.

Table 9. *Median Chemical Analyses of Groundwater*

(Results in milligrams per liter except where otherwise indicated)

Group or formation	Number of samples	pH (units)	Arsenic (As)	Aluminum (Al)	Alkalinity (as $CaCO_3$)	Cadmium (Cd)	Calcium (Ca)	Chloride (Cl)	Chromium (Cr)	Dissolved solids	Fluoride (F)	Hardness (as $CaCO_3$)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Magnesium (Mg)	Nickel (Ni)	NH_3-N	NO_2-N	NO_3-N	Potassium (K)	Sodium (Na)	Sulfate (SO_4)	Total org. carbon	Zinc (Zn)
Conemaugh Gp.	2	6.0	<0.01	0.10	48	<0.003	79.2	2.0	0.025	1125	0.12	482	54.2	<0.05	2.6	43.9	0.12	0.58	0.003	0.02	7.61	95.6	658	—	1.12
Mauch Chunk Fm.	5	7.1	<.01	.04	102	<.003	29.9	3.0	<.01	162	<.10	88	.33	<.05	.02	5.5	.02	.02	.002	.68	1.60	6.71	20	3.0	.02
Pocono Fm.	3	6.1	<.01	.05	24	<.003	2.9	1.0	.03	42	<.10	<20	5.29	<.05	.87	2.3	.01	.01	.002	.02	.64	4.07	5	—	.08
Catskill Fm.	27	7.3	<.01	.05	104	<.003	16.9	2.0	<.01	144	.12	72	.07	<.05	.03	7.7	<.01	.02	.002	.04	3.54	<10	15	1.0	.03
Foreknobs Fm.	5	7.3	<.01	.02	124	<.003	22.8	1.0	<.01	216	.14	110	.23	<.05	.11	10	.02	.02	.002	.04	1.16	8.47	20	—	.07
Scherr Fm.	6	7.4	<.01	.04	131	<.003	24.3	2.0	.02	196	.165	94	.04	<.05	.06	7.4	<.01	.05	.002	.08	.84	8.74	20	—	.01
Trimmers Rock Fm.	2	6.7	<.01	.02	69	<.003	12.0	7.0	.03	103	.23	58	0.8	<.05	.37	6.4	<.01	.18	.002	.64	<10	<10	25	—	.02
Brallier and Harrell Fms., undiv.	16	7.4	<.01	.04	135	<.003	24.8	2.5	<.01	188	.20	90	.09	<.05	.10	9.8	<.01	.09	.002	.02	3.56	21.2	20	—	.01
Hamilton Group	24	7.3	<.01	.04	112	<.003	35.2	2.0	<.01	237	.13	111	.22	<.05	.08	7.7	<.01	.10	.002	.02	1.26	<10	20	—	.02
Onondaga and Old Port Fms., undiv.	13	7.2	<.01	.03	108	<.003	57.7	3.0	.01	246	.12	166	.05	<.05	.01	6.7	<.01	.01	.002	.74	1.18	1.21	20	—	.02
Keyser and Tonoloway Fms., undiv.	11	7.6	<.01	.05	216	<.003	59.6	4.0	.01	311	.12	224	.09	<.05	.01	17.9	<.01	.01	.002	.56	.94	1.06	15	—	.02
Wills Creek Fm.	12	7.7	<.01	.03	213	<.003	41.9	3.5	.01	271	.13	193	.04	<.05	.01	16.9	<.01	.14	.002	.64	3.19	5.67	30	—	.01
Bloomsburg and Mifflintown Fms., undiv.	4	7.3	<.01	<.01	232	<.003	82.4	4.5	.01	342	.14	251	.06	<.05	.01	12.2	<.01	.06	<.002	1.17	1.73	4.02	30	—	.01
Clinton Gp.	3	8.0	<.01	.05	138	<.003	21.6	5.0	.01	186	.17	84	.15	<.05	.08	5.8	<.01	.21	.004	.02	2.08	24.8	15	—	.01
Reedsville Fm.	4	7.6	<.01	.04	85	<.003	16.8	2.0	.01	175	.14	134	.25	<.05	.04	5.1	.01	.02	.003	.04	.98	7.04	36	—	.03
Coburn Fm. through Loysburg Fm., undiv.	2	7.7	<.01	.04	202	<.003	46.2	10.5	<.01	294	0.8	158	.12	<.05	.01	11.6	.01	.845	.003	1.32	<10*	19.8	25	—	.06
Bellefonte and Axemann Fms., undiv.	9	7.4	<.01	.03	264	<.003	62.4	8.0	<.01	450	.10	284	.02	<.05	.01	32.3	<.01	.01	.004	7.16	2.06	6.38	30	—	.02
Nittany and Stonehenge/ Larke Fms., undiv.	5	7.4	<.01	.03	206	<.003	45.6	4.0	<.01	306	<.10	200	.03	<.05	<.01	26.1	<.01	.01	.002	2.64	<10	<10	20	—	.28
Stonehenge/Larke Fm.	3	7.8	<.01	.01	180	<.003	40.7	8.0	<.01	248	<.10	176	.01	<.05	<.01	20.5	—	.02	.002	5.06	—	.66	10	—	.03
Gatesburg Fm.	6	7.6	<.01	.04	211	<.003	49.2	4.5	.01	254	<.10	208	.10	<.05	.01	22.6	.01	.01	.002	1.5	1.11	6.05	15	—	.02
Combined Juniata River basin	164	7.4	<.01	.04	142	<.003	33.8	3.0	<.01	232	.12	131	.09	<.05	.02	9.6	<.01	.01	.002	.16	1.23	8.47	20	2.0	.02

*Single analysis

Table 10. *Summary of Chemical-Quality Characteristics of Groundwater from Predominantly Calcareous and Noncalcareous Rock Units*

Constituent (mg/L)	Predominantly noncalcareous units: Number of samples	Concentration[1] Minimum	Concentration[1] Median	Concentration[1] Maximum	Predominantly calcareous units: Number of samples	Concentration[1] Minimum	Concentration[1] Median	Concentration[1] Maximum
pH	102	4.7	7.3	9.2	62	5.7	7.5	8.0
Arsenic	102	<.01	<.01	.085	62	<.01	<.01	<.01
Aluminum	102	<.01	.04	2.21	62	<.01	.03	.92
Alkalinity ($CaCO_3$)	102	6	108	258	62	10	194	360
Cadmium	102	<.003	<.003	.004	62	<.003	<.003	<.003
Calcium	102	0.1	22.9	109	62	3.6	52.1	418
Chloride	102	0.4	3.0	84	62	<1.0	4.0	33
Chromium	101	<.01	<.01	.06	62	<.01	.01	.07
Dissolved solids	99	16	182	1926	56	14	306	3038
Fluoride	102	<.10	.14	.40	62	<.10	.10	1.5
Hardness ($CaCO_3$)	102	<20	89	792	62	<20	200	1764
Iron	102	<.01	.14	98.6	62	<.01	.04	1.85
Lead	102	<.05	<.05	.054	62	<.05	<.05	.054
Manganese	102	<.01	.08	4.58	62	<.01	.01	.20
Magnesium	102	1.0	7.7	75	62	<0.5	26.2	165
Nickel	94	<.01	<.01	.22	57	<.01	<.01	.04
NH_3-N	102	<.01	.01	.96	62	<.01	.01	1.68
NO_2-N	102	<.002	.002	.048	62	<.002	.002	.336
NO_3-N	102	<.02	.04	10.1	62	<.02	1.52	10.1
Potassium	93	0.22	1.77	14.1	57	.46	1.38	5.72
Sodium	101	0.88	13.4	190	62	.38	3.63	64.4
Sulfate	102	3	20	1200	62	3	20	1710
Zinc	102	<.01	.02	9.18	62	<.01	.02	6.0

[1] Concentrations in milligrams per liter, except pH (units).

Table 11. *Summary of Field Water-Quality Measurements*

(Values represent the quantity equaled or exceeded by the indicated percentage of wells)

Group, formation, or member	Type[1]	pH (units) No. of wells	pH 25%	pH 50% (median)	pH 75%	Hardness (grains/gal) No. of wells	Hardness 25%	Hardness 50% (median)	Hardness 75%	Specific conductance (micromhos) No. of wells	Sp. cond. 25%	Sp. cond. 50% (median)	Sp. cond. 75%
Conemaugh Gp.	D	1	—	6.7	—	—	—	—	—	—	—	—	—
	N	1	—	7.3	—	2	—	10	—	2	—	395	—
Allegheny Gp.	D	—	—	—	—	1	—	4	—	1	—	185	—
Mauch Chunk Fm.	D	2	7.7	7.0	6.3	23	7	5	2	23	270	205	107
	N	1	—	7.1	—	4	—	8	—	4	—	280	—
Pocono Fm.	D	2	7.8	7.6	7.5	6	4	3	2	6	215	105	90
Catskill Fm.[2]	D	10	7.4	7.0	6.8	53	6	4	3	54	263	200	155
	N	1	—	6.0	—	5	7	6	3	4	270	170	50
Irish Valley Mbr.	D	—	—	—	—	17	5	4	2	15	255	180	147
of Catskill Fm.	N	1	—	7.3	—	—	—	—	—	—	—	—	—
Foreknobs Fm.	D	2	7.4	7.39	7.37	17	6	5	4	18	325	245	160
	N	1	—	7.3	—	3	—	5	—	4	—	340	—
Lock Haven Fm.	D	—	—	—	—	5	6	5	4	5	240	210	185
Scherr Fm.	D	3	7.6	7.45	7.4	11	7	6	4	11	365	240	130
Trimmers Rock Fm.	D	5	7.3	7.1	7.0	18	4	4	2	17	218	165	118
Brallier and	D	10	7.2	7.2	6.8	48	7	5	4	50	355	245	210
Harrell Fms., undiv.	N	—	—	—	—	1	—	3	—	1	—	200	—
Hamilton Gp.	D	25	7.3	6.9	6.6	105	8	5	3	109	372	233	170
	N	5	7.6	7.3	6.9	4	11	8	5	6	452	390	340
Mahantango Fm.	D	18	7.3	6.8	6.3	62	7	4	3	65	300	200	140
	N	4	7.6	7.2	6.9	1	—	10	—	2	370	314	257
Marcellus Fm.	D	4	7.6	7.4	6.9	10	11	8	6	11	435	340	300
	N	1	—	7.3	—	—	—	—	—	1	—	540	—
Onondaga and	D	16	7.5	6.8	6.4	56	9	6	4	56	365	252	140
Old Port Fms., undiv.	N	1	—	7.2	—	1	—	16	—	1	—	560	—

Onondaga Fm.	D	8	6.8	6.6	5.9	15	9	7	2	15	360	300	113
	N	1	—	7.2	—	1	—	16	—	1	—	560	—
Old Port Fm.	D	5	7.9	7.6	6.2	20	8	6	2	20	350	250	95
Keyser and Tonoloway Fms., undiv.	D	24	7.3	7.2	6.9	70	18	14	9	67	650	430	340
	N	4	7.8	7.6	7.1	6	18	16	13	4	678	588	350
Wills Creek Fm.	D	44	7.7	7.5	7.2	76	17	12	8	73	592	453	305
	N	10	7.6	7.4	7.2	12	13	10	7	11	450	380	280
Bloomsburg and Mifflintown Fms., undiv.	D	25	7.6	7.2	6.7	55	8	6	4	53	455	280	205
	N	2	7.3	6.9	6.5	7	10	6	5	7	345	260	180
Bloomsburg Fm.	D	18	7.6	7.1	6.7	38	8	6	4	35	460	265	180
	N	2	—	6.9	—	5	—	6	—	5	—	230	—
Mifflintown Fm.	D	3	7.7	7.3	6.6	11	9	7	3	12	425	318	215
Clinton Gp.	D	3	7.6	7.2	6.7	18	9	5	4	17	310	250	175
	N	2	7.6	7.6	7.5	1	—	5	—	1	—	185	—
Tuscarora Fm.	D	—	—	—	—	3	—	2	—	3	—	90	—
Reedsville Fm.	D	3	7.5	7.0	7.0	11	5	4	4	11	247	205	160
	N	4	8.0	7.6	7.2	4	6	6	5	2	230	195	160
Coburn Fm. through Loysburg Fm., undiv.	D	3	—	7.2	—	7	—	10	—	7	—	370	—
Beekmantown Gp.	D	—	—	—	—	1	—	10	—	1	—	280	—
Bellefonte and Axemann Fms., undiv.	D	3	7.4	7.3	7.2	14	19	18	16	14	660	609	605
	N	—	—	—	—	2	—	18	—	2	—	686	—
Nittany and Stonehenge/Larke Fms., undiv.	D	1	—	7.1	—	8	18	13	10	8	655	555	265
Stonehenge/Larke Fm.	D	—	—	—	—	2	—	9	—	2	—	335	—
Gatesburg Fm.	D	5	7.4	7.3	6.8	16	14	11	8	16	467	431	247
Warrior Fm.	D	1	—	6.9	—	3	—	7	—	3	—	265	—

[1] D, domestic use; N, nondomestic use (municipal, industrial, and commercial).

[2] Includes Catskill Formation, undivided (Dck on Plate 1), and Duncannon, Sherman Creek, and Irish Valley Members of Catskill Formation (Dcd, Dcsc, and Dciv on Plate 1). Irish Valley Member is also listed separately.

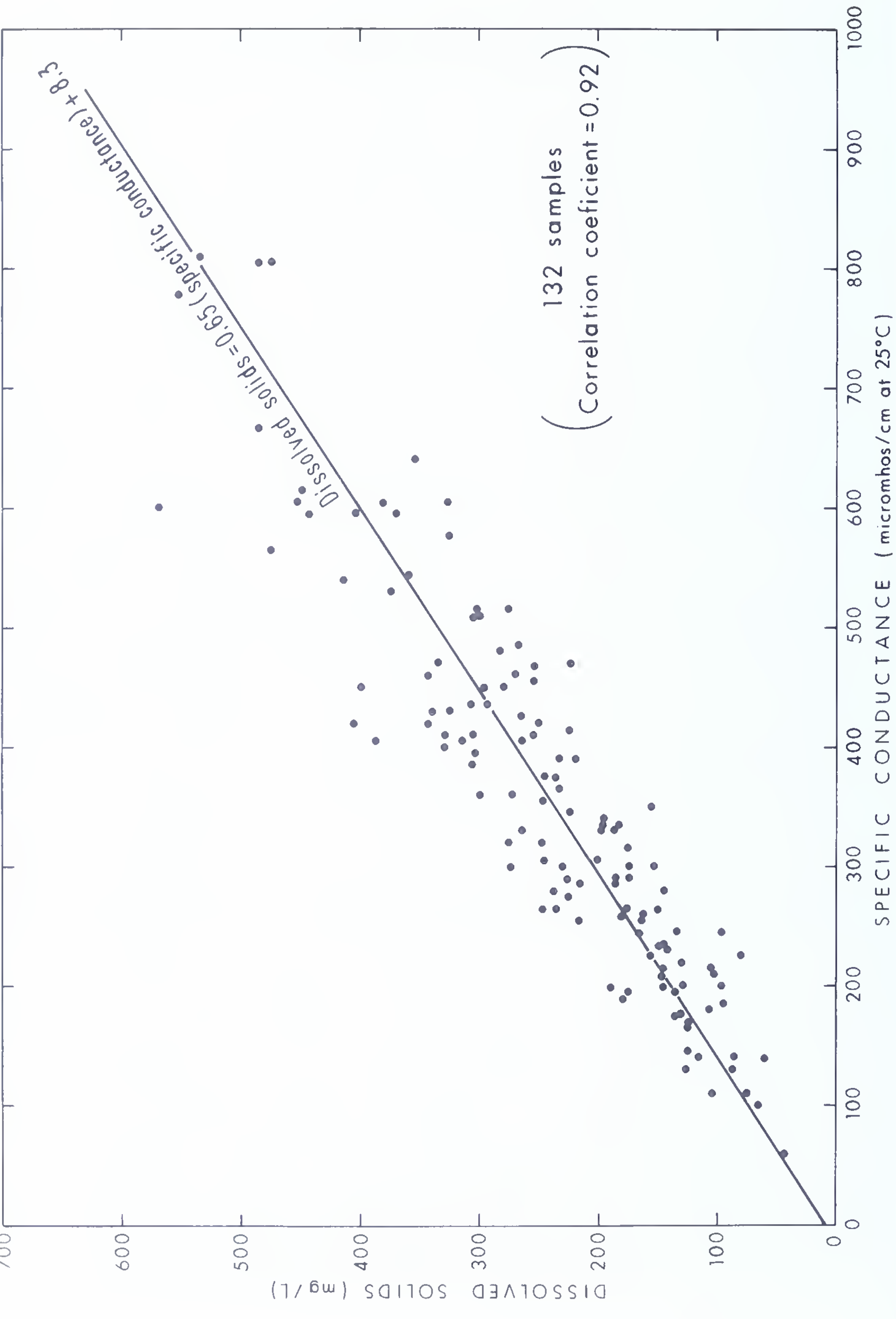


Figure 14. Relationship of dissolved solids to field specific conductance.

ments of hardness are reported in grains per gallon rather than in milligrams per liter because the field method is only accurate to plus or minus one grain per gallon. To state the results in milligrams per liter would imply a false accuracy. The approximate milligrams per liter may be obtained by multiplying the number of grains per gallon by 17.1.

The inset map on Plate 1 shows the distribution of groundwater hardness in the Juniata River basin. In general, groundwater is hardest in the major valleys underlain by limestone and calcareous shale. Comparatively soft water occurs under ridges, hillsides, and other areas underlain by sandstone and shale.

IRON AND MANGANESE

Iron and manganese, which resemble each other in chemical behavior, are generally present in groundwater in small concentrations. If concentrations of one or both of these constituents combined exceed 0.3 mg/L (the U. S. Environmental Protection Agency recommended limit for iron), staining of plumbing fixtures and cooking utensils can occur.

Samples containing objectionable amounts of iron were collected from almost every rock unit, but were more frequent from wells located in noncalcareous shale and sandstone.

Of the 164 samples analyzed for iron and manganese, 43 (or about 26 percent) exceeded recommended limits for iron (0.3 mg/L) and 59 (or about 36 percent) exceeded recommended limits for manganese (0.05 mg/L). Thus iron and manganese constitute the most troublesome constituents in groundwater in the basin.

HYDROGEN SULFIDE

Many wells that penetrate shales of the Reedsville, Marcellus, and Mahantango Formations were reported to produce water having the "rotten egg" odor of hydrogen sulfide. No measurements were made for this constituent, but occurrences appear to be sporadic and unpredictable throughout the area, although they are most common in shales. Hydrogen sulfide is distasteful but harmless in drinking water.

NITRATE

Nitrate generally occurs in low concentrations in groundwater unaffected by human activities. The lower median concentration of 0.04 mg/L of nitrate in water from predominantly noncalcareous rock units is compared to the median of 1.52 mg/L for calcareous units. This higher median concentration of nitrate in water from calcareous rock units may be due in part to extensive fertilization of the intensively cultivated soils overlying these rock units.

Only two of 164 samples exceeded the U. S. Environmental Protection Agency (1975) mandatory limits for nitrate of 10 mg/L as N. This low number may be partly due to the attempt in this study to collect water samples that would reflect background (or uncontaminated) groundwater quality; thus wells with potentially high nitrate may have been missed.

TRACE METALS

Measurements were made for several potentially toxic trace constituents to determine their occurrence within the basin. The metals tested for were arsenic, cadmium, chromium, lead, and zinc. Table 8 lists the normal source and significance of these elements.

No areal patterns could be ascertained from the few samples that exceeded mandatory drinking-water limits for these constituents. Most samples had levels of these metals below detectable limits; however five had a chromium content above the required 50 micrograms per liter, two samples contained excessive zinc, and a single sample had lead and arsenic above the U. S. Environmental Protection Agency limit. Cadmium was detected in a single sample and the concentration was within drinking-water standards.

WATER-QUALITY PROBLEMS

The most commonly reported groundwater-quality problems in the Juniata River basin are, in order of prevalence, excessive iron and/or manganese, hydrogen sulfide, hardness, bacterial organisms from sewage, petroleum products from buried storage tanks, excessive nitrates, landfill leachate, and acid mine drainage. Most of these are local in extent and often confined to individual wells or a small area. The vast majority of problems could be eliminated by the use of deeper casing and insuring that the annular opening around the exterior of the casing is tightly sealed with cement grout.

Bacterial contamination is possible in any area where on-lot disposal systems are utilized. This is especially true in communities of closely spaced homes, where some wells must unavoidably be placed downslope from leach fields on adjacent lots. Also, the shallow groundwater around urban areas is often contaminated by leakage from sewer systems.

Hydrocarbon contamination of groundwater is generally caused by leakage of fuel oil or gasoline from buried storage tanks. Most known instances involved less than 10 acres and occurred most frequently where there was a high concentration of petroleum terminals and service stations such as in the vicinity of Altoona, Bellwood, and East Freedom.

Although a potential source of serious problems, few instances of landfill leachate contamination of wells have been reported. This may be due in part to the placement of landfill sites in sparsely populated localities.

Groundwater Quality in the Broad Top Area

The Broad Top coal field in Bedford, Fulton, and Huntingdon Counties contains the only significant section of coal-bearing rocks in the Juniata River basin. The first commercial development of coal there occurred in the mid-1800's and reached its peak about 1918. Historically, most of the coal was removed by underground mining, whereas today surface mining predominates.

As a result of this long history of development much of the land has been disturbed by either surface- or deep-mining operations, and groundwater quality has in some places been seriously degraded by acid mine water.

Sixty-two samples of groundwater were collected from the Bedford County part of the field in 1979 by the Bedford County Planning Commission in cooperation with the Department of Environmental Resources. These samples were collected in an effort to determine the degree and extent of the groundwater-quality problem. The results of these analyses are given in Table 12 and the sample locations are shown on Figure 15.

Eight samples, or about 13 percent, were found to be seriously contaminated by mine water (high iron, manganese, and sulfate; low pH). Another 13 samples, or 21 percent, appeared to be slightly contaminated.

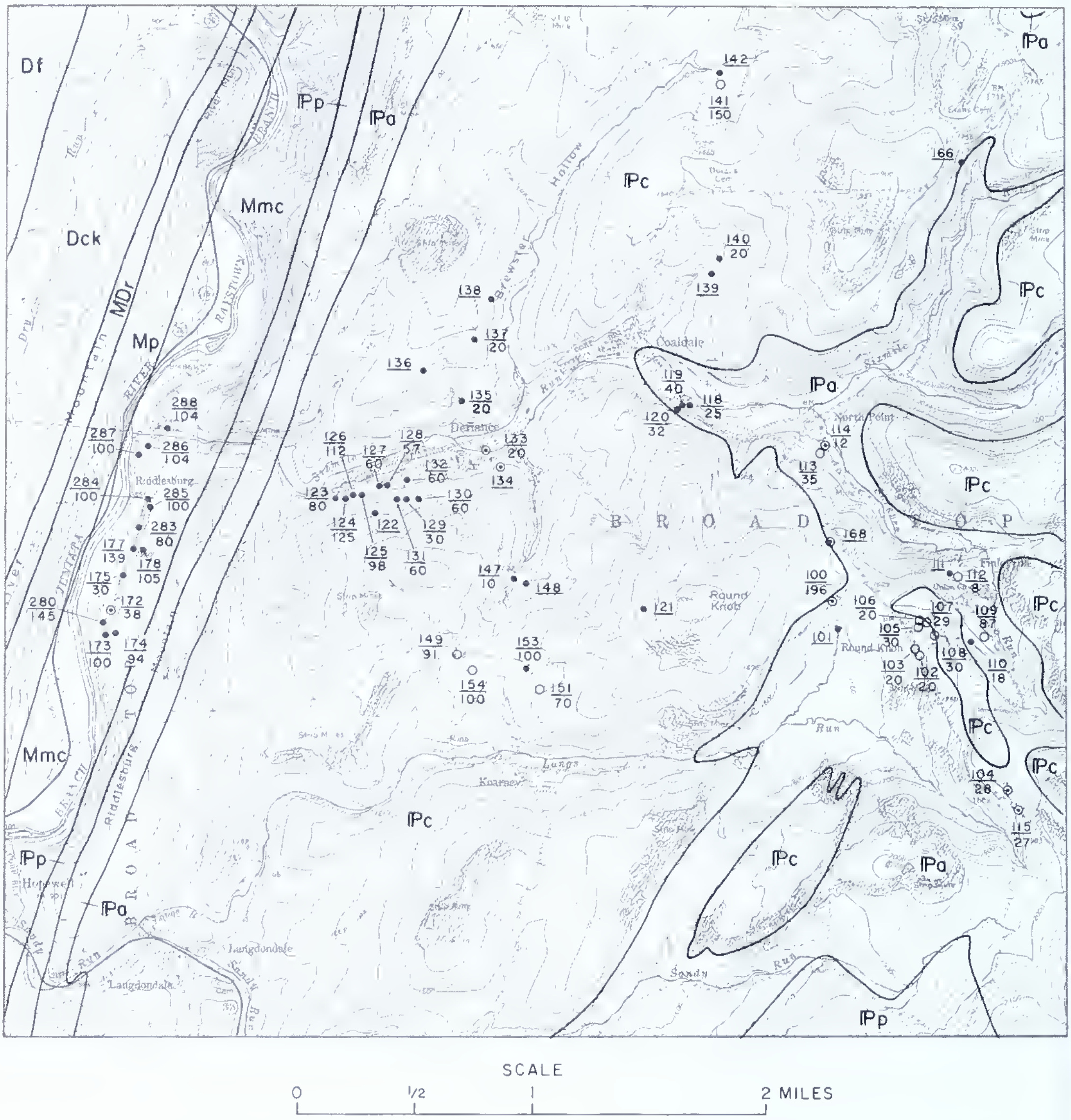
Fourteen of the 18 samples collected from the Allegheny Group showed definite indications of mine water contamination. Only 6 of 22 samples from the Conemaugh Group were thought to be contaminated. Table 13 lists the median and range of analyses of groundwater from the rock units investigated.

STRATIGRAPHY AND WATER-BEARING PROPERTIES OF THE ROCKS

The stratigraphic discussion in this report is based on the work of several authors: Conlin and Hoskins (1962), Dyson (1963), Butts (1939, 1945), Faill and Wells (1974), Miller (1961), Knowles (1966), Flueckinger (1969), and Faill and others (in preparation). Figure 16 shows the areas covered by reports containing large-scale geologic maps and detailed stratigraphic descriptions within the Juniata River basin. The geology and stratigraphic nomenclature on Plate 1 are from the *Geologic Map of Pennsylvania* (Berg and others, 1980).

Descriptions of the water-bearing properties of the rocks are partly from data collected by Lohman (1938), Seaber and Hollyday (1966), and Johnson (1970). Additional physical information on wells and groundwater quality was collected by the authors.

Geologic formations within the basin are described in order of increasing geologic age. Table 14 summarizes well construction and yield data by



EXPLANATION

GEOLOGIC UNITS

IPc Conemough Gp.	Mp Pocono Fm.
IPa Allegheny Gp	MDr Rockwell Fm
IPp Pottsville Gp	Dck Catskill Fm.
Mmc Mouch Chunk Fm	Df Foreknobs Fm.

GROUNDWATER SAMPLING POINTS

• 123/80	○ 113/35	⊙ 114/12
Uncontaminated	Moderately contaminated	Seriously contaminated

Upper number represents sample number; lower number represents well depth, in feet

Figure 15. Geologic map of the Broad Top area, showing the locations of groundwater sampling points.

Table 12. *Partial Chemical Analyses of Groundwater from the Broad Top Area*

(Results are in milligrams per liter except where otherwise indicated)

Sample no.	Iron (Fe)	Manganese (Mn)	Aluminum (Al)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Hardness (as $CaCO_3$)	Alkalinity (as $CaCO_3$)	Acidity (as $CaCO_3$)	pH (units)
Bd-100	51.84	1.75	<.01	435	3	.02	275	16	100	6.3
102	.11	.04	.10	15	10	1.70	32	16	10	6.1
103	.09	.32	.50	40	6	1.00	46	8	8	5.2
104	.20	2.43	5.88	90	2	1.16	102	6	36	4.4
105	.09	.21	.30	25	25	4.18	<20	6	8	5.2
106	.09	.33	.32	25	36	9.68	40	8	2	5.2
107	.10	.17	.16	80	22	3.30	102	24	2	5.9
108	.27	.05	.10	20	5	2.42	<20	10	2	5.8
109	.09	.43	.12	20	5	1.98	<20	18	2	5.8
110	.11	.03	.80	15	4	2.63	<20	12	1	6.0
112	.12	.06	.10	15	25	3.08	40	12	2	5.8
113	.10	<.01	.04	60	27	2.00	80	34	1	6.3
114	.20	.92	3.42	110	20	2.86	132	4	28	4.4
115	.12	5.13	12.00	325	2	.60	275	5	76	4.4
118	.06	<.01	.06	45	25	2.20	88	68	0	6.6
119	.07	.01	.14	25	4	6.30	50	14	4	6.0
120	.09	.01	.12	35	2	5.46	68	38	0	6.5
123	.95	.24	.04	35	5	.02	152	124	0	7.0
124	.09	.04	.02	40	6	.84	185	160	0	7.1
125	.26	.16	.08	25	2	.04	176	178	0	7.3
126	.03	.01	.06	40	11	.10	<20	172	0	7.6
127	.13	.05	.08	15	3	.06	130	122	0	7.2
128	.69	.16	.02	15	3	.02	140	134	0	7.3
129	.13	<.01	.08	15	4	2.42	32	26	0	6.6
130	.05	.01	.06	35	6	3.52	80	50	0	6.6
131	.26	.02	.04	15	3	.16	108	106	0	7.2

Table 12. *(Continued)*

Sample no.	Iron (Fe)	Manganese (Mn)	Aluminum (Al)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Hardness (as $CaCO_3$)	Alkalinity (as $CaCO_3$)	Acidity (as $CaCO_3$)	pH (units)
Bd-132	.59	.24	.04	20	8	.02	152	134	0	7.0
133	3.69	.02	<.01	125	11	3.08	168	42	0	6.8
135	.13	.02	.10	15	3	.72	<20	18	2	6.4
136	.14	.02	.06	15	2	1.28	<20	10	1	5.9
137	.35	.05	.08	15	2	1.18	<20	20	10	6.2
140	.07	<.01	.10	20	2	1.92	<20	16	0	6.7
141	6.75	.48	.04	75	2	.02	135	72	0	6.5
147	.05	.01	.16	20	2	.62	30	26	0	6.7
149	.52	.08	.02	50	2	.36	140	98	0	6.8
151	1.46	1.43	<.01	15	1	.02	70	74	0	6.8
153	.34	.18	.02	10	2	.84	<20	26	2	6.3
154	6.57	.98	.04	10	5	.02	30	48	10	6.4
166	.14	.07	.04	20	3	2.86	32	26	4	6.4
168	5.13	.30	.10	1110	4	.02	32	20	10	5.8
172	2.52	.04	.02	75	11	7.56	130	48	0	6.4
173	.07	<.01	.02	30	4	1.74	130	118	0	7.8
174	.12	.01	<.01	25	2	.64	84	78	0	7.6
175	1.73	.01	.12	25	2	.80	30	12	0	7.5
177	.08	.01	.06	25	2	.42	104	104	0	7.9
178	.11	<.01	.06	25	2	.80	90	96	0	7.9
280	.09	<.01	.04	25	10	4.62	54	28	0	7.1
283	1.93	.07	2.32	35	3	1.50	54	40	0	6.8
284	.07	.01	.04	65	20	13.26	180	112	0	7.1
285	.39	.01	.02	65	20	13.26	175	92	0	7.4
286	.06	.02	.04	500	6	1.18	552	156	0	7.6
287	.09	<.01	.02	330	6	3.08	335	66	0	7.1
288	.04	.02	.04	55	9	4.40	180	134	0	7.9

Sp-101	.14	.05	.14	10	10	4.40	<20	8	2	5.6
Sp-111	.10	.01	.08	15	12	3.52	32	12	1	6.5
Sp-121	.10	.02	.10	20	3	3.08	130	112	0	7.5
Sp-122	.15	.01	.06	20	2	1.30	88	76	0	7.4
Sp-134	.33	.01	.08	135	7	1.26	158	30	0	6.5
Sp-138	.05	.02	.06	15	2	1.66	20	14	0	6.5
Sp-139	.08	.01	.06	15	2	.96	<20	14	0	6.7
Sp-142	.15	.60	.10	60	2	.98	82	24	0	7.1
Sp-148	.19	.04	.18	15	2	.88	<20	18	0	7.0

Table 13. *Median and Range of Chemical Analyses from the Broad Top Area*

(Results are in milligrams per liter except where otherwise indicated)

	Iron (Fe)	Manganese (Mn)	Aluminum (Al)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Hardness (as $CaCO_3$)	Alkalinity (as $CaCO_3$)	Acidity (as $CaCO_3$)	pH
CONEMAUGH GROUP (22 samples)										
Median	0.26	0.05	0.04	20	3	0.49	75	61	0	6.8
Range	.03-6.8	<.01-1.4	<.01-.16	10-125	1-11	.02-3.5	<20-185	10-178	0-10	5.9-7.6
ALLEGHENY GROUP (18 samples)										
Median	.10	.19	.12	38	6	2.3	48	13	3	5.8
Range	.06-52	<.01-5.1	.01-12	15-1110	2-36	.02-9.7	<20-275	4-68	0-100	4.4-6.6
MAUCH CHUNK FORMATION (13 samples)										
Median	.09	.01	.04	35	6	1.7	130	92	0	7.5
Range	.04-2.5	<.01-.07	.01-2.3	25-500	2-20	.42-13	30-552	12-156	—	6.4-7.9

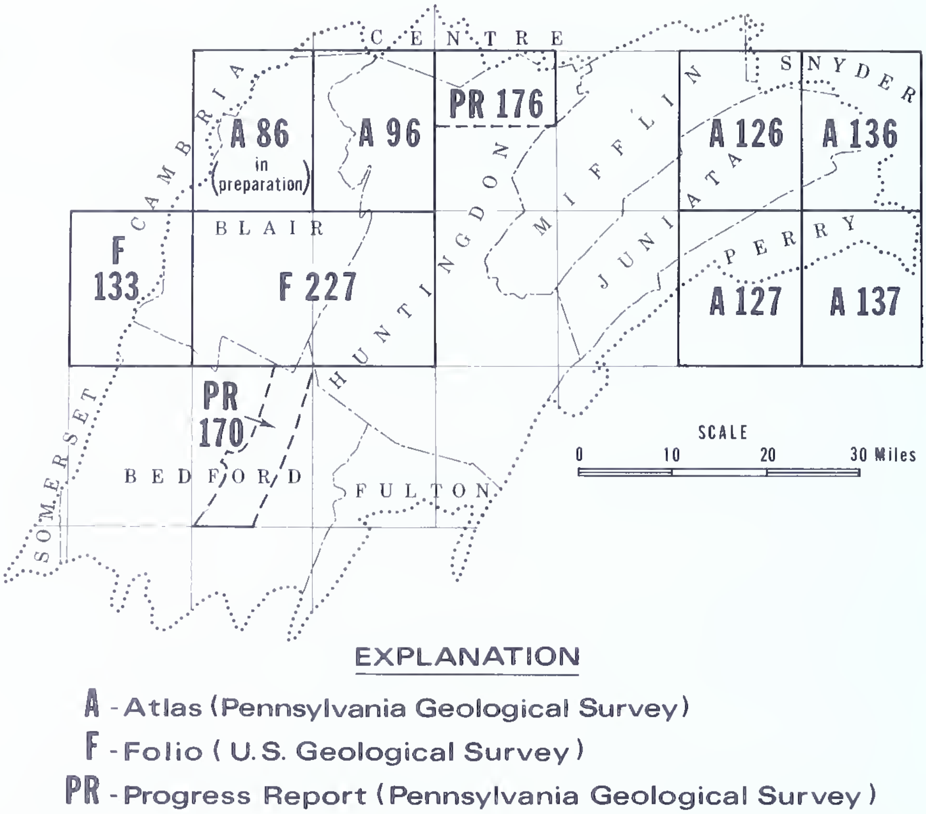


Figure 16. Areas of detailed geologic mapping in the Juniata River basin.

formation. Medians given for water-bearing properties and water-quality data approximate the most common values obtained from randomly located wells; ranges suggest the magnitude of potential values. Also given in the discussion are the number of wells having reported yields less than 5 gal/min and greater than 100 gal/min. These are good indicators of the potential for development of a successful domestic well and municipal supply well, respectively.

The recommended and mandatory limits, in addition to health effects, of the chemical constituents of groundwater described in the following sections are given in Table 8.

CONEMAUGH GROUP THROUGH POTTSVILLE GROUP

Stratigraphy

The Pennsylvanian rocks in the Juniata River basin are, from youngest to oldest, the Conemaugh, Allegheny, and Pottsville Groups. These rock units underlie the Broad Top coal field in parts of Huntingdon, Bedford, and Fulton Counties and a small area along the Appalachian Front in Somerset and Blair Counties.

Table 14. *Summary of Well Construction and Yield Data*

(Values represent the quantity equaled or exceeded by the indicated percentage of wells)

Group or formation	Type[1]	Well depth (feet) No. of wells	25%	50% (median)	75%	Casing length (feet) No. of wells	25%	50% (median)	75%	Depth to water (feet) No. of wells	25%	50% (median)	75%	Reported well yield (gal/min) No. of wells	25%	50% (median)	75%	Specific capacity ([gal/min]ft) No. of wells	25%	50% (median)	75%
Conemaugh Gp.	D	6	—	122	—	5	—	24	—	4	—	59	—	6	—	4	—	4	—	0.05	—
	N	2	—	100	—	2	—	24	—	2	—	35	—	2	—	26	—	2	—	.80	—
Allegheny Gp.	D	5	—	142	—	4	—	44	—	4	—	35	—	5	—	2	—	3	—	.01	—
Pottsville Gp.	N	2	—	225	—	2	—	30	—	2	—	26	—	2	—	170	—	2	—	8.7	—
Mauch Chunk Fm.	D	39	210	115	96	39	42	38	22	32	45	25	18	37	24	12	6	12	.50	.16	.06
	N	9	—	150	—	9	—	36	—	7	—	25	—	8	—	19	—	3	—	.94	—
Pocono Fm.	D	20	283	170	124	19	42	39	24	20	70	30	20	19	20	15	6	15	.35	.18	.09
	N	2	—	202	—	2	—	29	—	1	—	55	—	2	—	49	—	1	—	.82	—
Rockwell Fm.	D	1	—	100	—	1	—	36	—	1	—	40	—	1	—	8	—	1	—	.26	—
Catskill Fm.[2]	D	132	273	204	148	122	42	34	21	108	100	60	21	127	15	10	5	55	.20	.10	.04
	N	17	468	300	156	15	42	40	24	13	115	58	24	17	73	30	14	11	.54	.40	.09
Irish Valley Mbr. of Catskill Fm.	D	39	170	148	117	37	42	40	36	35	48	28	20	39	20	15	10	5	.88	.25	.15
	N	2	—	232	—	2	—	34	—	3	—	175	—	3	—	50	—	2	—	.16	—
Foreknobs Fm.	D	47	184	140	83	42	32	23	21	39	70	30	15	45	20	10	8	35	.33	.18	.07
	N	4	—	108	—	4	—	21	—	4	—	24	—	4	—	10	—	2	—	.08	—
Lock Haven Fm.	D	14	217	108	80	12	40	21	20	10	49	38	12	11	12	4	2	6	.29	.16	.10
	N	3	—	150	—	3	—	30	—	3	—	13	—	3	—	30	—	2	—	.50	—
Scherr Fm.	D	32	195	138	100	32	40	25	21	31	73	41	20	31	20	7	3	17	.68	.15	.04
Trimmers Rock Fm.	D	31	238	155	96	28	45	41	34	23	50	30	20	30	20	10	6	—	—	—	—
	N	4	—	285	—	3	—	25	—	4	—	35	—	4	—	80	—	1	—	1.0	—
Brallier and Harrell Fms., undiv.	D	129	214	141	80	116	40	24	21	105	50	20	12	123	12	6	3	63	.26	.15	.04
Hamilton Gp.[3]	D	255	173	104	70	237	41	27	21	209	36	20	10	243	20	12	6	76	1.0	.51	.17
	N	34	300	216	110	26	50	37	21	24	39	15	4	30	135	38	11	20	2.2	.89	.20
Mahantango Fm.	D	133	152	100	65	123	42	25	20	111	40	23	11	126	20	12	6	35	1.3	.60	.30
	N	11	220	120	90	8	42	35	21	7	31	20	4	8	190	26	11	7	2.2	.56	.19
Marcellus Fm.	D	47	120	82	70	43	40	31	22	38	38	20	9	46	20	15	5	10	1.1	.88	.57
	N	2	—	50	—	2	—	28	—	—	—	—	—	1	—	10	—	—	—	—	—
Onondaga and Old Port Fms.,	D	144	223	141	90	133	110	56	30	119	65	40	18	135	20	10	7	60	1.3	.31	.10
undiv.[4]	N	24	248	215	150	18	118	57	30	15	54	21	3	22	150	66	30	11	2.2	1.5	.60
Onondaga Fm.	D	28	215	99	75	27	85	42	28	22	62	31	15	26	20	10	7	7	.80	.48	.10
	N	3	—	80	—	2	—	34	—	2	—	16	—	1	—	25	—	1	—	2.5	—
Old Port Fm.	D	45	224	163	120	43	155	95	40	37	84	54	30	39	20	12	7	9	1.0	.50	.24
	N	5	—	219	—	5	—	42	—	4	—	22	—	5	—	60	—	3	—	1.7	[illegible]
Keyser and Tonoloway Fms.,	D	172	180	106	72	147	72	42	25	153	57	30	14	155	20	10	6	47	1.2	.48	.15
undiv.	N	30	225	175	125	24	66	46	25	23	51	40	20	29	80	33	10	11	1.7	1.1	.60

Table 14. *(Continued)*

Group or formation	Type[1]	Well depth (feet) No. of wells	25%	50% (median)	75%	Casing length (feet) No. of wells	25%	50% (median)	75%	Depth to water (feet) No. of wells	25%	50% (median)	75%	Reported well yield (gal/min) No. of wells	25%	50% (median)	75%	Specific capacity ([gal/min]ft) No. of wells	25%	50% (median)	75%
Wills Creek Fm.	D	165	144	100	74	149	53	39	26	145	43	26	15	152	20	15	8	54	1.5	.55	.19
	N	50	210	137	100	44	53	40	28	35	50	32	15	47	100	40	16	18	5.0	.90	.22
Bloomsburg and	D	116	145	95	70	105	45	28	20	95	35	20	12	102	15	10	6	36	.70	.26	.12
Mifflintown Fms., undiv.	N	16	250	177	80	10	70	35	26	16	52	36	8	16	18	15	8	8	1.3	.68	.08
Bloomsburg Fm.	D	54	120	96	70	53	46	36	23	49	28	20	10	49	15	11	8	19	.68	.22	.17
	N	8	—	128	—	7	—	31	—	8	—	36	—	8	—	16	—	3	—	.80	—
Mifflintown Fm.	D	28	220	81	60	25	30	22	19	25	40	20	15	25	12	5	2	7	.40	.15	.10
	N	1	—	35	—	—	—	—	—	1	—	6	—	1	—	10	—	—	—	—	—
Clinton Gp.	D	48	220	151	92	42	51	27	21	37	44	25	18	46	15	10	6	12	.28	.19	.12
	N	12	290	192	163	10	40	34	24	9	44	20	9	12	30	20	10	6	.67	.50	.30
Tuscarora Fm.	D	7	—	70	—	7	—	38	—	5	—	38	—	7	—	5	—	1	—	.10	—
Juniata Fm.	D	1	—	165	—	1	—	40	—	—	—	—	—	1	—	20	—	—	—	—	—
Bald Eagle Fm.	D	4	—	252	—	3	—	24	—	2	—	30	—	3	—	30	—	2	—	.32	—
Reedsville Fm.	D	30	190	130	110	27	52	33	21	17	55	33	8	26	25	12	7	4	5.0	1.2	.24
	N	12	300	130	56	10	40	34	27	8	24	16	5	12	42	20	10	8	.59	.51	.25
Coburn Fm. through Loysburg	D	25	230	200	100	23	47	40	23	16	39	26	5	23	20	6	4	6	—	.04	—
Fm., undiv.	N	2	—	270	—	1	—	21	—	1	—	36	—	2	—	13	—	1	—	.10	—
Bellefonte and Axemann Fms.,	D	31	300	156	101	31	70	42	20	24	85	50	26	31	40	10	8	9	.78	.50	.17
undiv.	N	5	—	50	—	4	—	32	—	3	—	3	—	5	—	30	—	1	—	.07	—
Nittany and Stonehenge/Larke	D	30	261	173	120	29	123	66	22	20	113	97	59	28	25	15	10	9	.64	.40	.06
Fms., undiv.	N	6	—	194	—	3	—	92	—	3	—	49	—	6	—	26	—	2	—	1.6	—
Stonehenge/Larke Fm.	D	2	—	135	—	2	—	71	—	1	—	33	—	2	—	59	—	—	—	—	—
Gatesburg Fm.	D	35	345	264	163	34	181	83	47	24	170	116	70	35	20	9	5	10	.21	.08	.06
	N	4	—	452	—	4	—	204	—	4	—	214	—	4	—	300	—	3	—	13.0	—
Warrior Fm.	D	6	—	182	—	6	—	79	—	5	—	74	—	5	—	30	—	4	—	.62	—
Pleasant Hill Fm.	D	1	—	90	—	1	—	87	—	—	—	—	—	1	—	15	—	—	—	—	—
Waynesboro Fm.	D	1	—	125	—	1	—	39	—	—	—	—	—	1	—	9	—	—	—	—	—

[1] D, domestic use; N, nondomestic use (municipal, industrial, and commercial).

[2] Includes Catskill Formation, undivided (Dck on Plate 1), and Duncannon, Sherman Creek, and Irish Valley Members of Catskill Formation (Dcd, Dcsc, and Dciv on Plate 1). Irish Valley Member is also listed separately.

[3] Includes the wells listed for the Mahantango and Marcellus Formations.

[4] Includes the wells listed for the Onondaga and Old Port Formations.

The rock units are primarily composed of gray and black shale and claystone, gray and brown sandstone, and coal. Sandstone becomes more abundant toward the bottom and constitutes nearly 80 percent of the Pottsville Group. The maximum thickness of Pennsylvanian rocks is between 1,000 and 1,500 feet in the Broad Top area, whereas no more than 200 feet of Pennsylvanian rocks is exposed along the Front.

Water-Bearing Properties

Reported yields of 15 wells ranged from 0 to 255 gal/min. The median yield of 11 domestic wells was about 3 gal/min. Two nondomestic wells in the Conemaugh Group averaged 26 gal/min and two in the Pottsville Group averaged 17 gal/min. Over half of the wells yielded less than 5 gal/min and one well had a reported yield greater than 100 gal/min.

Well depths ranged from 42 to 338 feet; six wells had depths of less than 100 feet and one well was greater than 300 feet deep.

Water Quality

Two groundwater samples from these rock groups were collected for analysis in the laboratory. Both were slightly acidic and high in iron, manganese, and sulfate.

Evaluation of the Aquifer

Large supplies of groundwater can often be obtained from the lower part of this sequence of rocks, and domestic supplies should be possible throughout. However, water quality is a persistent problem, iron and manganese being the most common problem constituents. Also, past mining has altered the hydrogeologic system, making site-specific studies necessary to locate potable groundwater supplies.

MAUCH CHUNK FORMATION

Stratigraphy

The Mauch Chunk Formation crops out along the edge of the Appalachian Plateau and in an irregular band around the Broad Top coal field. Along the plateau the unit consists primarily of gray sandstone and minor amounts of red and green siltstone and mudstone. Fine-grained rocks are more common in the upper part (about 50 percent) and coarse-grained rocks are dominant in the remainder. In the Broad Top area the unit is almost entirely red shale, but contains some thin red and green sandstone layers. The thickness varies from about 180 feet along the Appalachian Front to approximately 1,000 feet in Trough Creek valley.

Water-Bearing Properties

Reported yields of 45 wells ranged from 1 to 60 gal/min. The median yields of domestic and nondomestic wells were 12 gal/min and 32 gal/min, respectively. Six of the wells yielded less than 5 gal/min and none yielded more than 100 gal/min.

Reported depths of 48 wells ranged from 60 to 360 feet and the median was about 110 feet. Eighteen wells were less than 100 feet deep and only five were greater than 300 feet deep.

Depth to yielding zones was reported for 43 wells. On the average a well penetrated more than two zones, and the highest percentage of these zones was in the 50- to 100-foot depth range. The deepest reported zone was at 328 feet.

Water Quality

Five groundwater samples were collected for analysis in the laboratory. Three of these samples exceeded drinking-water standards for iron and one sample had excessive manganese. The median iron and manganese values were 0.33 mg/L and 0.02 mg/L, respectively. The water from the Mauch Chunk Formation is a calcium bicarbonate type, as shown in Figure 17.

Field analyses gave a median hardness value of about 5 grains per gallon (23 samples), a median specific conductance of 205 micromhos (23 samples), and a median pH of 7.0 (2 samples). These data indicate that water from the Mauch Chunk Formation is moderately soft and comparatively low in dissolved solids.

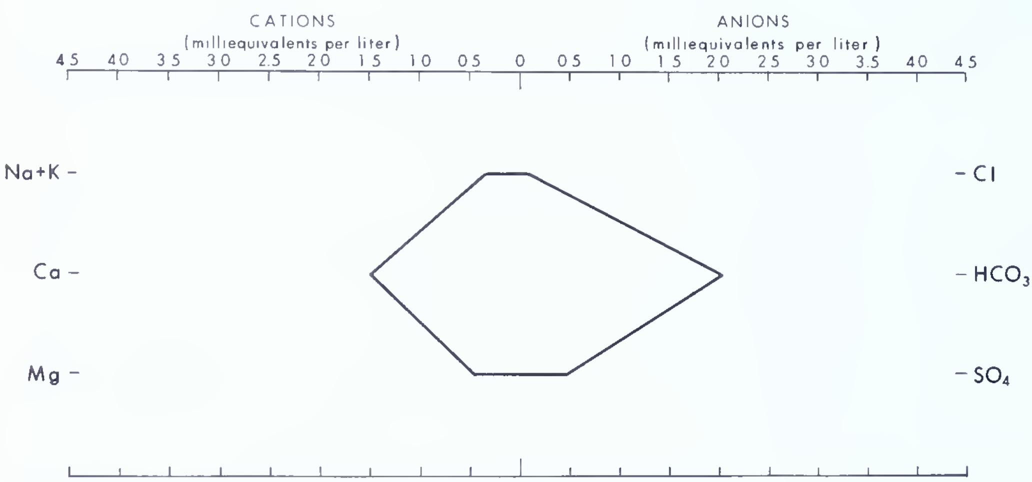


Figure 17. Stiff diagram of the median chemical character of groundwater from the Mauch Chunk Formation.

Evaluation of the Aquifer

The Mauch Chunk Formation will, in general, yield sufficient water of acceptable quality for domestic use and other uses requiring small to moderate supplies. High levels of iron and manganese are a frequent problem.

Large supplies (100 gal/min or more) will probably be difficult to obtain owing to the lithologic character (predominantly shale) of the unit in the central part of the basin. The abundance of sandstone in the formation along the Appalachian Front would suggest that high yields might be possible. However, the thinness and topographic position of the unit there would minimize that possibility.

POCONO FORMATION, BURGOON SANDSTONE, AND ROCKWELL FORMATION

Stratigraphy

The Middle Mississippian rocks mapped as the Pocono Formation around the Broad Top coal field and as the Burgoon and Rockwell Formations along the Appalachian Front range in thickness from about 550 feet in the west to about 1,400 feet at Terrace Mountain in Huntingdon County.

The Burgoon Sandstone consists predominantly of quartzitic sandstones, with conglomeratic quartzite near the base and impure sandstone in the medial portion. Argillaceous siltstones constitute a minor part of the formation, which has an overall thickness of about 250 feet.

The Rockwell Formation consists of 300 feet of impure sandstone and minor siltstone and shale. A 65-foot shale sequence separates a basal sandstone from the remainder of the formation.

The upper part of the Pocono, equivalent to the Burgoon Sandstone, consists of nearly continuous, thick-bedded sandstone having a thickness of 375 to 500 feet. The remaining two thirds is composed predominantly of gray sandy shale and includes beds of gray and red sandstone, red shale, and some layers of clay.

Water-Bearing Properties

Reported yields of 22 wells ranged from 2 to 118 gal/min. The median reported yield of 20 domestic wells was 15 gal/min, and two nondomestic wells yielded an average of 49 gal/min. Only three of the wells yielded less than 5 gal/min and two had reported yields greater than 100 gal/min.

Well depths ranged from 45 to 500 feet; four wells had depths of 100 feet or less and five wells were deeper than 300 feet. The median depth of domestic wells was 170 feet.

Data on depths to water-bearing zones were reported for only 12 wells. Every well that penetrated the 50- to 100-foot interval reported a yielding zone, and 70 percent of the wells that penetrated the 101- to 200-foot interval reported water-bearing zones. The deepest reported zone was at 320 feet.

Water Quality

Three groundwater samples were collected from the Pocono Formation for analysis in the laboratory. All of these samples exceeded drinking-water standards for iron and manganese. The median for iron was 5.29 mg/L and for manganese, 0.79 mg/L.

Six field analyses indicate that the water is moderately soft (median hardness of 3 grains per gallon) and low in dissolved solids (median specific conductance of 105 micromhos).

Evaluation of the Aquifer

The sandstones within the Middle Mississippian rocks are ridge formers throughout much of the area and as such have low aquifer potential. However, when these rocks are present below the water table they should provide moderate to large supplies of water to wells. Apparently, high levels of iron and manganese will be a constant problem.

CATSKILL FORMATION

Stratigraphy

The Catskill Formation varies in thickness from about 7,450 feet in the eastern part of the basin to about 2,500 feet near Altoona. Three members are shown on the accompanying geologic map, the Duncannon, Sherman Creek, and Irish Valley Members.

Approximately three fourths of the Catskill Formation is composed of shale and mudstone, and sandstone makes up the remainder. Few of the sandstone strata exceed 50 feet in thickness and most are between 5 and 20 feet thick. Eighty to 95 percent of the unit is red in color.

Water-Bearing Properties

Reported yields of 144 wells ranged from 1 to 100 gal/min. The median yields of domestic and nondomestic wells were 10 and 30 gal/min, respectively. About 15 percent of the wells yielded less than 5 gal/min and three were reported to yield 100 gal/min.

Figure 18 is a frequency plot of reported yields from the Catskill Formation and shows that the Irish Valley Member had somewhat higher yields

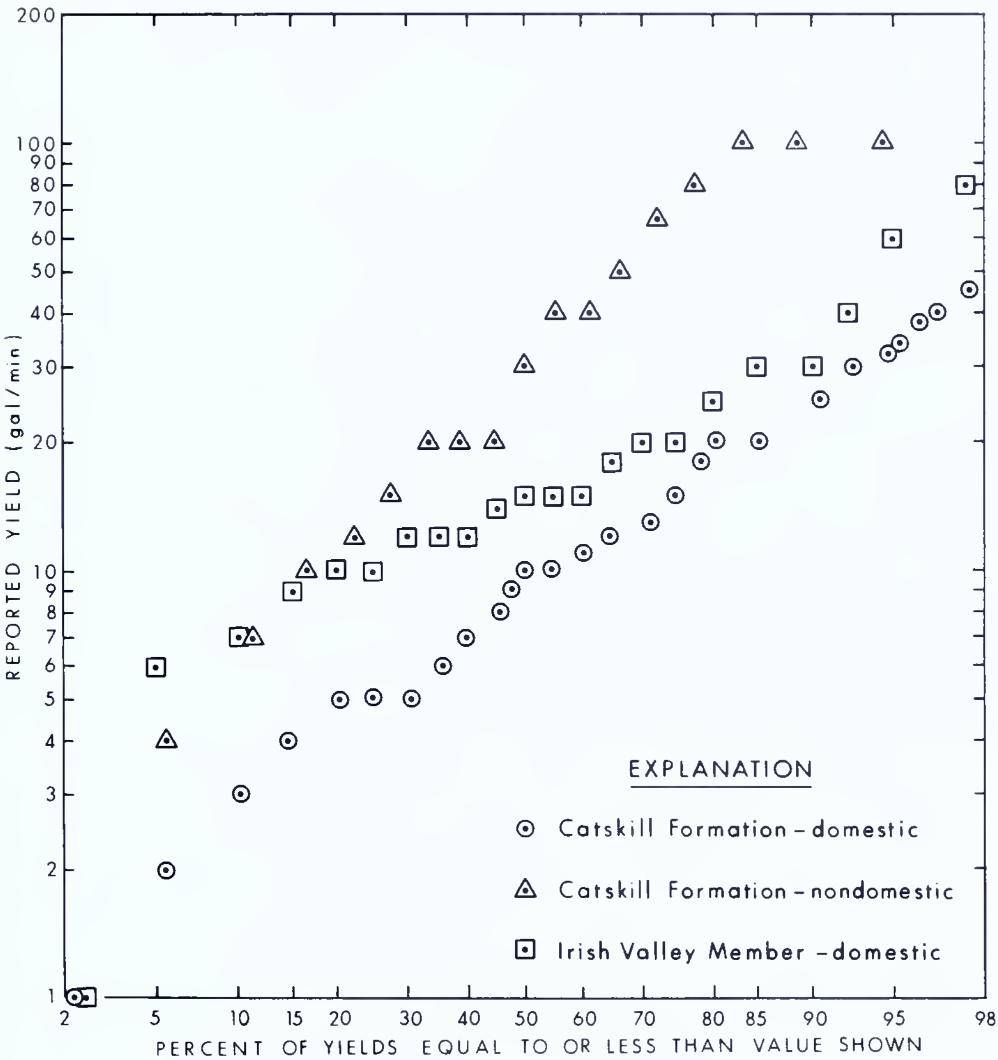


Figure 18. Percent frequency distribution of reported well yields from the Catskill Formation.

than the rest of the formation. The plot also shows that domestic wells consistently had reported yields about one third as high as those drilled for nondomestic uses.

Reported depths of 140 wells ranged from 12 to 580 feet. The median for domestic wells was 204 feet and for nondomestic wells was 300 feet. Nineteen wells obtained sufficient water at depths of less than 100 feet and 35 were deeper than 300 feet.

Depth to yielding zones was reported for 127 wells. An average of about one zone per 100-foot interval was reported to a depth of 300 feet. Over three fourths of the wells drilled deeper than 300 feet penetrated additional yielding zones. The deepest reported zone was at 560 feet.

Water Quality

Twenty-seven water samples were collected for complete chemical analysis. Two samples did not meet drinking-water standards—in one, arsenic was too high, and in the other, zinc. Fifteen and 40 percent of the samples contained excessive iron and manganese, respectively. The water is a calcium bicarbonate type, as shown in Figure 19.

The median hardness from 53 field analyses was 4 grains per gallon. The median specific conductance (54 samples) and pH (10 samples) were 200 micromhos and 7.4, respectively. These data indicate that water from the Catskill Formation is moderately soft and comparatively low in dissolved solids.

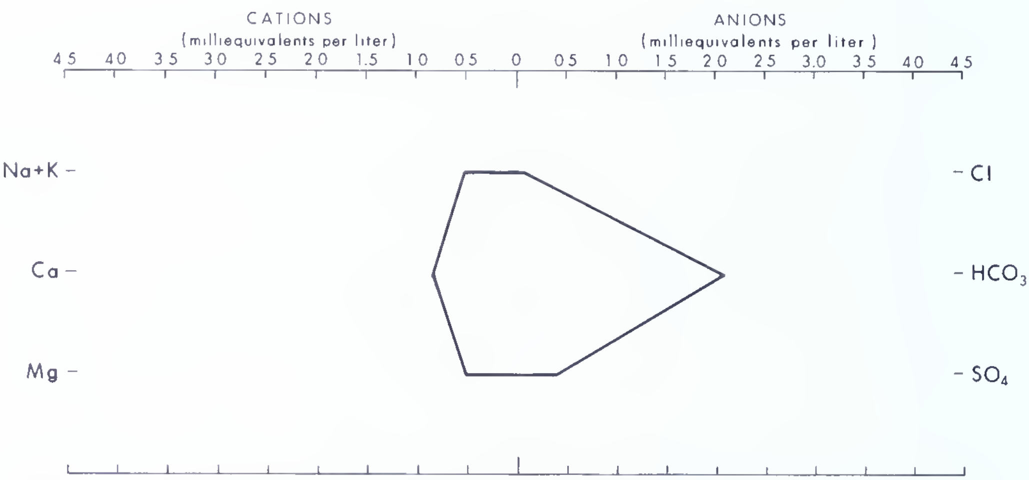


Figure 19. Stiff diagram of the median chemical character of groundwater from the Catskill Formation.

Evaluation of the Aquifer

The Catskill Formation will yield water of acceptable quality for domestic use and other uses requiring small to moderate supplies. Two of every five wells produce water that contains high levels of iron and manganese.

Because of the formation's high shale content, large supplies are difficult to obtain. It should be possible to develop comparatively high yielding wells (100 to 150 gal/min) in intervals containing mostly sandstone. The lower part of the Irish Valley Member is probably the best water-bearing interval in the Catskill Formation. Wells should be drilled to at least 350 feet and perhaps as deep as 600 feet if maximum yields are needed.

FOREKNOBS, SCHERR, AND LOCK HAVEN FORMATIONS

Stratigraphy

In the southwestern part of the basin the Upper Devonian rocks lying be-

the Foreknobs and Scherr Formations. To the north, beginning at approximately the southern boundary of the Altoona quadrangle, the equivalent stratigraphic section is mapped as the Lock Haven Formation. These units are not recognized in the eastern part of the basin, because the Catskill Formation there is underlain directly by the Brallier Formation and/or the Trimmers Rock Formation.

The Foreknobs Formation is about 1,500 to 1,600 feet thick and consists of gray conglomerate, sandstone, siltstone, mudstone, and shale. The unit is thin to very thick bedded in layers ranging from 0.5 inch to 10 feet.

The Scherr Formation is made up of siltstone, shale, mudstone, and some sandstone and is up to 1,900 feet thick. The siltstone and sandstone within the formation are olive gray to greenish gray and thin to thick bedded. Locally the mudstone is brownish gray, but it is primarily medium gray, as is the shale.

At Altoona, the Lock Haven is predominantly siltstone and argillaceous siltstone (approximately 60 percent), and contains lesser amounts of sandstone (20 percent), shale (15 percent), and conglomerate (less than 5 percent). The formation can be divided into three parts: a lower, fine-grained portion, a coarse-grained medial part, and a fine-grained upper sequence which has conglomerate at the top. The thickness is about 1,900 to 2,000 feet.

Water-Bearing Properties

Reported yields of 94 wells ranged from 1 to 60 gal/min. The median yields of domestic wells were 10, 7, and 4 gal/min for the Foreknobs, Scherr, and Lock Haven Formations, respectively. Four nondomestic wells in the Foreknobs had a median yield of 10 gal/min and three in the Lock Haven had a median of 30 gal/min. About one fourth of the wells inventoried in these formations had reported yields of less than 5 gal/min and none had yields greater than 100 gal/min.

Depths of 100 wells ranged from 33 to 583 feet. The medians for domestic wells ranged from 108 to 140 feet. Thirty wells were less than 100 feet deep and only six were greater than 300 feet.

As suggested by the depth data, shallow yielding zones are abundant in these formations. Nearly 90 percent of the wells that penetrated the 51- to 150-foot range had at least one yielding zone. The deepest reported zone was at 343 feet.

Water Quality

Five water samples were collected from the Foreknobs Formation and six from the Scherr Formation for laboratory analysis. The results were quite similar, as shown by the Stiff diagrams in Figures 20 and 21. Five of the 11 samples were high in iron and eight had high levels of manganese. A single

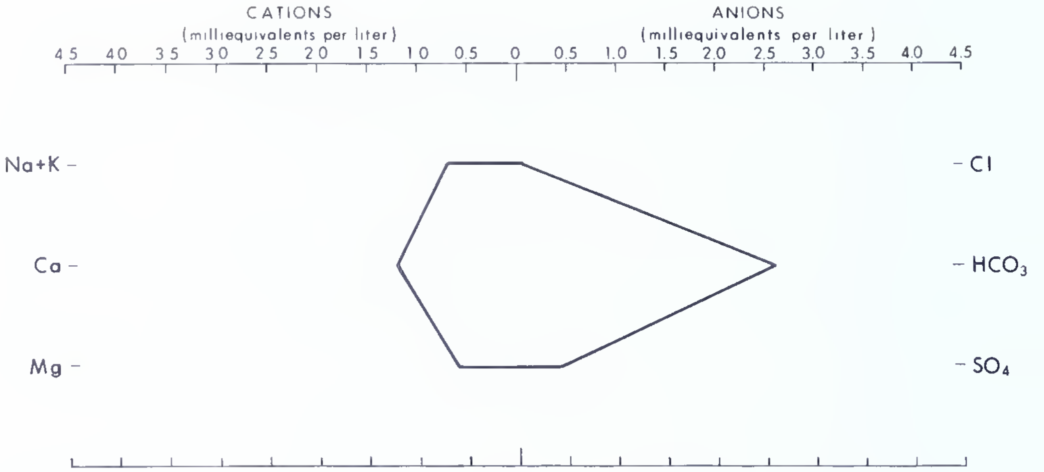


Figure 20. Stiff diagram of the median chemical character of groundwater from the Scherr Formation.

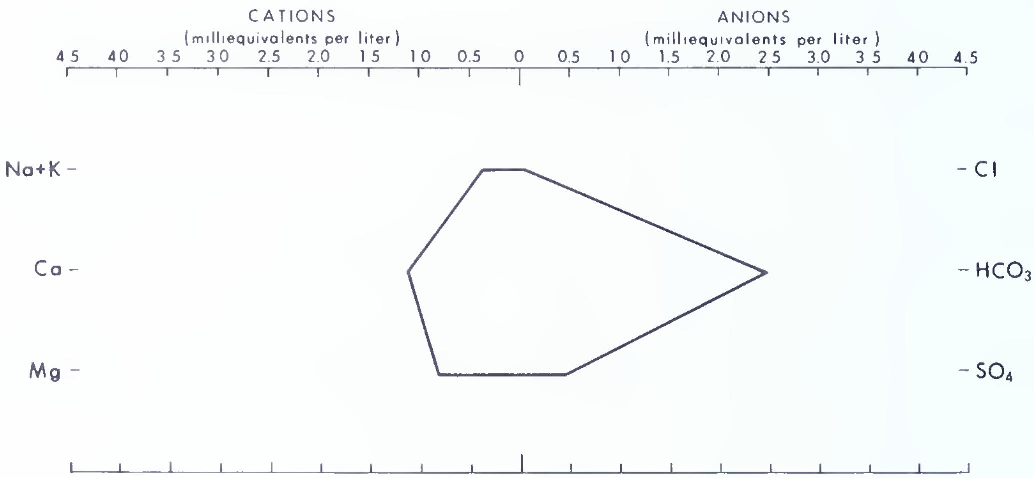


Figure 21. Stiff diagram of the median chemical character of groundwater from the Foreknobs Formation.

sample from the Foreknobs had a dissolved-solids content higher than the recommended limit. The water is a calcium bicarbonate type.

The results of 36 field analyses indicate that the water is moderately hard (median hardness of 5 grains per gallon). The median specific conductance of the three formations ranges from 210 to 245 micromhos.

Evaluation of the Aquifer

These rocks generally yield sufficient groundwater for small supplies; however, a large percentage of domestic supplies may be marginal for some uses (about 25 percent of the domestic wells produce less than 5 gal/min).

More than half of the wells produce water containing objectionable amounts of iron and manganese.

TRIMMERS ROCK, BRALLIER, AND HARRELL FORMATIONS

Stratigraphy

The Trimmers Rock Formation consists of 2,000 to 2,500 feet of light-olive-gray and medium-gray siltstone and silty shale and minor amounts of interbedded very fine grained sandstone in the upper part.

The characteristic Trimmers Rock lithologies are not recognized in the west, where this portion of the stratigraphic section is mapped as the Brallier Formation. The Brallier Formation consists of interbedded shale, silty shale, and siltstone. Shale and silty shale constitute 50 to 80 percent of the formation. The thickness is approximately 2,700 feet.

The Harrell Formation generally consists of two parts, a lower black shale, the Burket Member, and an upper unnamed gray shale. In some areas the Tully Member, which is composed of argillaceous limestone, is present at the base. Thicknesses for the Harrell range from 200 feet in the east to about 375 feet in the west.

Water-Bearing Properties

Reported yields of 153 wells ranged from 1 to 130 gal/min. The median yields of domestic wells for the Trimmers Rock Formation and the combined Brallier and Harrell Formations were 10 and 6 gal/min, respectively. Four nondomestic wells had a median yield of 80 gal/min. Approximately one third of the inventoried wells had yields less than 5 gal/min and only two had yields greater than 100 gal/min.

Well depths ranged from 33 to 620 feet. The medians for domestic wells were 141 and 155 for the Brallier-Harrell and the Trimmers Rock Formations, respectively. The four nondomestic wells had a median depth of 285 feet.

Data on water-bearing zones were reported for 127 wells. A typical pattern of a decrease in frequency of zones with depth can be observed from these data. Only two of nine wells drilled deeper than 350 feet penetrated zones below that depth. The deepest reported zone was at 457 feet.

Water Quality

Eighteen samples of groundwater were collected from these formations for analysis in the laboratory. Six samples exceeded recommended limits for iron and 12 for manganese. Calcium is the dominant cation, although the sodium-plus-potassium and the magnesium are nearly as abundant, as shown in Figure 22. Bicarbonate is the dominant anion.

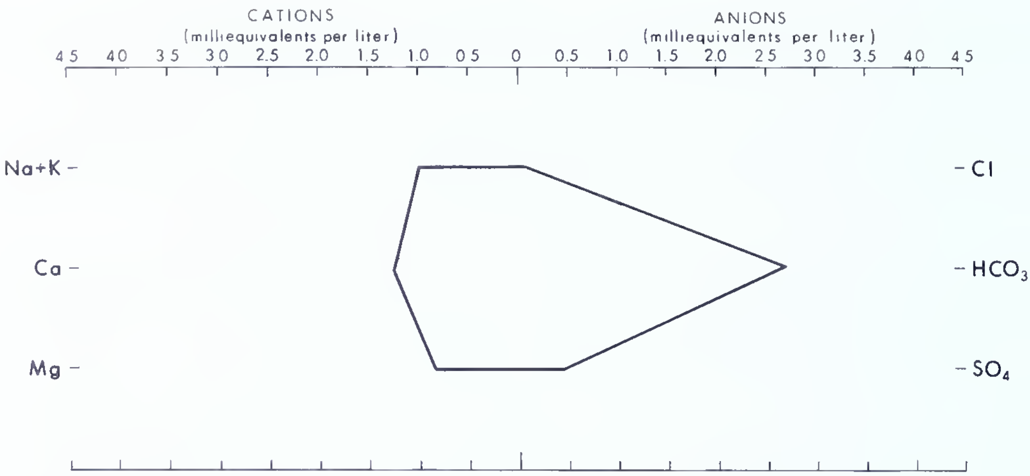


Figure 22. Stiff diagram of the median chemical character of groundwater from the Brallier Formation.

The median hardness from 67 field analyses was about 5 grains per gallon. The median specific conductances were 165 micromhos for the Trimmers Rock and 245 micromhos for the combined Brallier and Harrell Formations. These data indicate that the water is moderately hard and comparatively low in dissolved solids.

Evaluation of the Aquifer

These rocks are among the poorest in yielding capability of all the rocks within the basin. Most attempts at obtaining domestic supplies will be successful, although over a third will have marginal yields for some uses (less than 5 gal/min). One of three wells produces water containing objectionable amounts of iron and two of three produce objectionable amounts of manganese. Excessive hydrogen sulfide is an occasional problem.

HAMILTON GROUP

Stratigraphy

The Hamilton Group consists of the Mahantango Formation, including the Sherman Ridge and Montebello Members, and the Marcellus Formation.

The Mahantango Formation is generally composed of interbedded shale, siltstone, and sandstone and varies in thickness from 1,200 to 1,700 feet. However, at Altoona the unit is predominantly shale and contains lesser amounts of silty shale and a few argillaceous siltstone beds; it is reported to be about 640 feet thick. The Sherman Ridge Member, where present, is a light-olive-gray silty claystone that is generally massive and displays an ellipsoidal or spheroidal exfoliation. The Montebello Member consists of

very fine to fine-grained siliceous sandstone and a small amount of conglomeratic sandstone which ranges up to 1,000 feet in thickness.

The Marcellus Formation consists of very dark gray to black, fissile shale that is generally thin bedded. Measured thicknesses range from slightly more than 100 feet to 330 feet.

Water-Bearing Properties

Reported yields of 243 wells ranged from 1 to 380 gal/min. A frequency plot of reported yields from domestic wells (Figure 23) suggests that there is no significant difference in frequency yields between the undivided Hamilton Group and the separate Mahantango and Marcellus Formations. Therefore the statistical values that follow are from the undivided unit unless otherwise stated. The median reported yields were 12 gal/min and 38 gal/min for domestic and nondomestic wells, respectively. Forty-nine wells, or about 18 percent, had yields less than 5 gal/min. Eleven wells, or about 4 percent, had yields greater than 100 gal/min.

Well depths ranged from 10 to 695 feet, and the medians were 173 and 300 feet for domestic and nondomestic wells, respectively. Nearly 45 percent of the wells were 100 feet or less in depth and 10 percent were greater than 300 feet.

Data on water-bearing zones for 198 wells indicate that zones are relatively common to a depth of about 350 feet but occur most frequently in the 50- to 150-foot range. The deepest reported zone was at 635 feet.

Water Quality

Twenty-four water samples were collected from the Hamilton Group for laboratory analysis. About 46 and 62 percent of the samples exceeded recommended limits for iron and manganese, respectively. One sample did not meet drinking-water standards for chromium, and another did not meet the standards for dissolved solids. The water is a calcium bicarbonate type (Figure 24).

The median hardness from 105 field analyses was 5 grains per gallon. Water from the Marcellus Formation is apparently somewhat harder than water from the remainder of this rock group, having a median of 8 grains per gallon from 10 wells. The median specific conductance was 233 micromhos.

Evaluation of the Aquifer

The Hamilton Group will, in general, yield sufficient water of acceptable quality for small to moderate supplies. Over half of the wells produce water containing objectionable amounts of iron and manganese, and many produce water containing hydrogen sulfide.

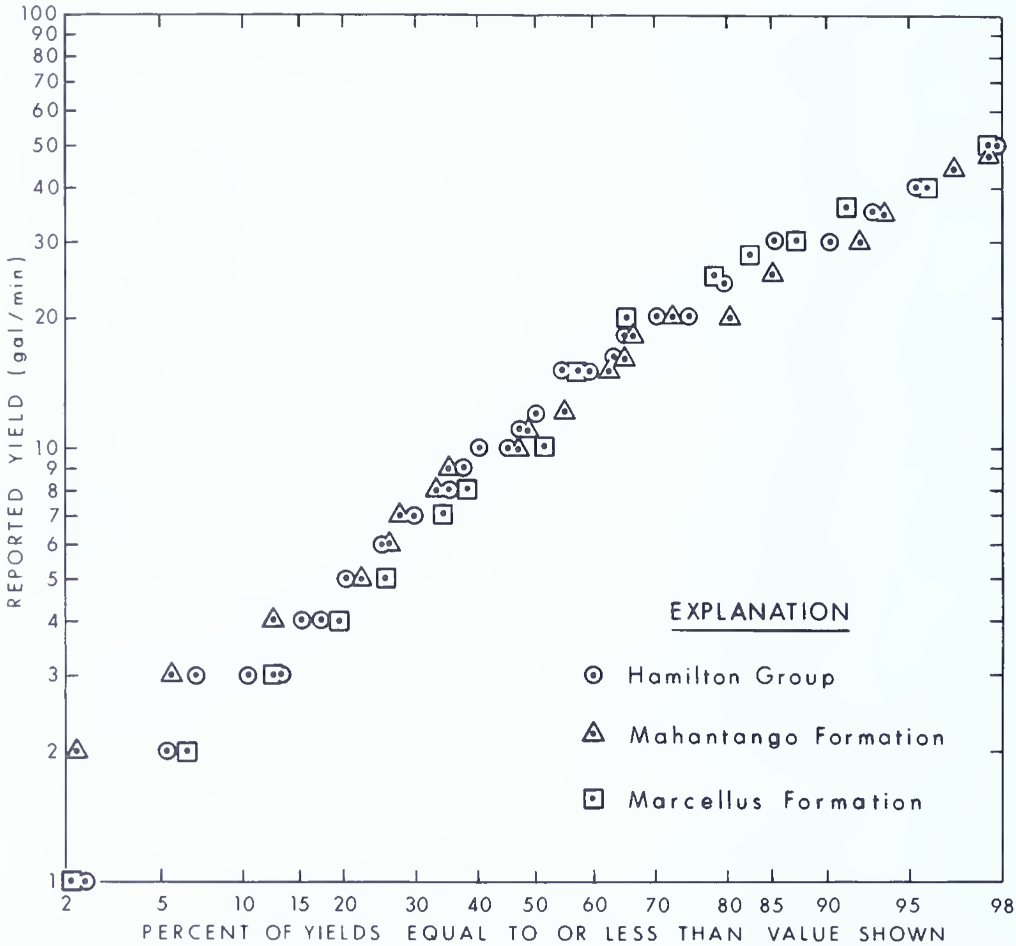


Figure 23. Percent frequency distribution of reported domestic-well yields from the Hamilton Group.

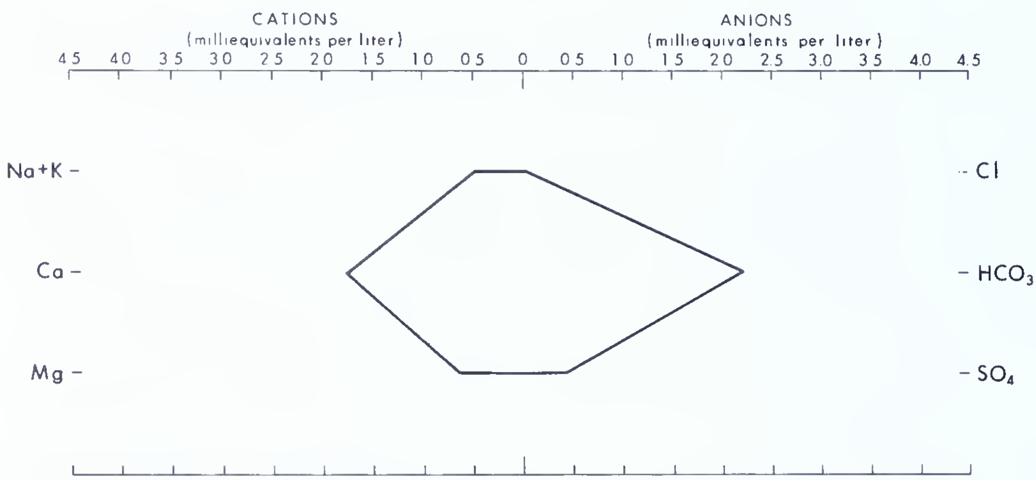


Figure 24. Stiff diagram of the median chemical character of ground-water from the Hamilton Group.

Large supplies of water can potentially be developed from parts of the Mahantango Formation, as 25 percent of the wells drilled for nondomestic use had yields of 190 gal/min or more.

ONONDAGA AND OLD PORT FORMATIONS

Stratigraphy

The Onondaga and Old Port Formations are mapped as a single unit throughout much of the study area. Where they are sufficiently thick and the necessary detailed mapping exists, they are shown as separate units. The Onondaga Formation consists primarily of interbedded dark-gray limestone, shaly limestone, and calcareous and noncalcareous shale. In many localities the lower part is mostly calcareous shale (almost 95 percent near Altoona), whereas the upper part is primarily limestone (about 75 percent in the vicinity of Altoona). Reported thicknesses for this unit range from about 50 to 175 feet.

The Old Port Formation is made up of two units: a lower unit consisting of chert, cherty limestone, and calcareous shale, and an upper calcareous quartz sandstone (the Ridgeley Member).

Water-Bearing Properties

Table 14 lists median well construction and yield data for the two formations separately as well as combined. The data do not indicate any significant difference between the two, at least for domestic wells; therefore the discussion that follows is for the combined units unless otherwise mentioned.

Reported yields of 228 wells ranged from 0 to 1,400 gal/min. The medians were 10 and 66 gal/min for domestic and nondomestic wells, respectively. Only 16 wells had reported yields of less than 5 gal/min (about 7 percent), and 13 had yields greater than 100 gal/min (about 6 percent).

Well depths ranged from 35 to 500 feet. The median depth for 144 domestic wells was 141 feet, and for 24 nondomestic wells the median was 215 feet. Fifty-three wells were less than 100 feet deep and 20 were deeper than 300 feet.

Water-bearing-zone data were reported for 88 wells. Zones appeared to be evenly distributed to a depth of 300 feet. Twenty-five percent of the wells drilled deeper than 300 feet penetrated water-bearing zones below that depth; the deepest reported zone was at 460 feet.

Water Quality

Thirteen samples were collected from these formations for analysis in the laboratory. A single sample each exceeded mandatory and recommended

limits for chromium and sulfate, respectively. About 23 percent of the samples had elevated amounts of iron, and a single sample had high manganese. The water is a calcium bicarbonate type, as shown in Figure 25.

The median hardness from 57 field analyses was 6 grains per gallon and the median specific conductance was 252 micromhos. These data indicate that the water is moderately hard and comparatively low in dissolved solids.

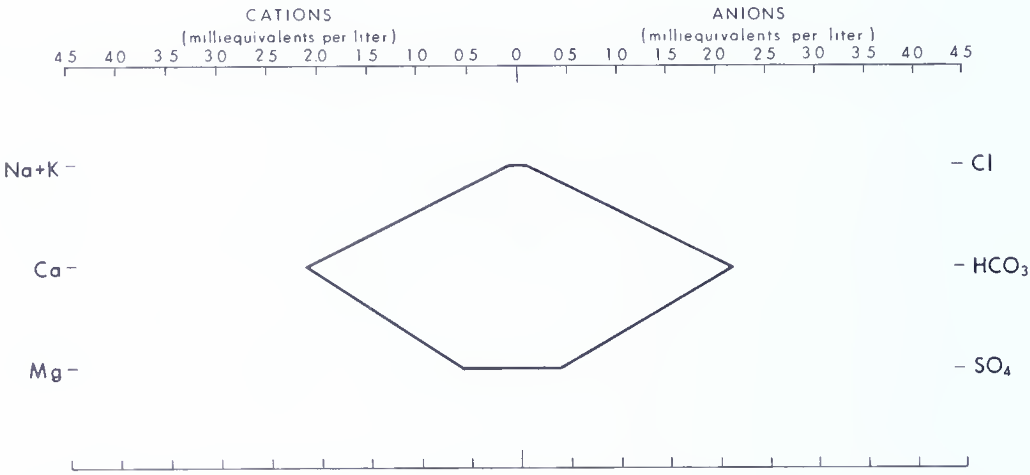


Figure 25. Stiff diagram of the median chemical character of groundwater from the Onondaga and Old Port Formations, undivided.

Evaluation of the Aquifer

Only a very low percentage (about 7 percent) of the wells drilled for domestic use had marginal yields (less than 5 gal/min). Also, elevated amounts of iron and manganese were not as serious a problem as in groundwater from most of the rock units in the basin. Therefore, these units should be good for the development of small to moderate supplies of groundwater.

Large supplies of water may be developed from parts of these formations, as 25 percent of the wells drilled for nondomestic use had yields of 150 gal/min or more. Most of the larger yields will probably be from the Ridgeley Member of the Old Port Formation. Occasional problems occur when completing wells in the Ridgeley, however, because the sandstone is sometimes quite friable, requiring a screen to keep the well bore open.

KEYSER AND TONOLOWAY FORMATIONS

Stratigraphy

The Keyser Formation ranges in thickness from about 100 to 200 feet and consists of an upper, mainly laminated, sequence of limestones and a basal nodular limestone. The middle part is sometimes arenaceous and cherty.

The Tonoloway Formation is composed of medium-gray, very thin to thick-bedded, laminated limestone and argillaceous limestone. A small amount of shale sometimes occurs as interbeds. Reported thicknesses range from 430 to 820 feet.

Water-Bearing Properties

Reported yields of 184 wells ranged from 0 to 315 gal/min. The median yield for domestic wells was 10 gal/min and the median for nondomestic wells was 33 gal/min. Twenty-one wells had reported yields of less than 5 gal/min and 11 had yields of 100 gal/min or more.

Well depths ranged from 27 to 504 feet; 86 wells were 100 feet or less deep and 15 were 300 feet or more deep. The median depths for domestic and nondomestic wells were 180 and 225 feet, respectively.

Water-bearing zones appear to be abundant to a depth of 300 feet. Four of 9 wells drilled deeper than 300 feet reported zones below that depth, and the deepest occurred at 470 feet.

Water Quality

Eleven samples were collected from these formations for analysis in the laboratory. A single sample exceeded drinking-water standards for chromium. The water can be characterized as a calcium bicarbonate type, as shown in Figure 26.

The median hardness from 76 field analyses was 14 grains per gallon, which is considered to be very hard. The water is moderately high in dissolved solids, as indicated by the median specific conductance of 430 micromhos.

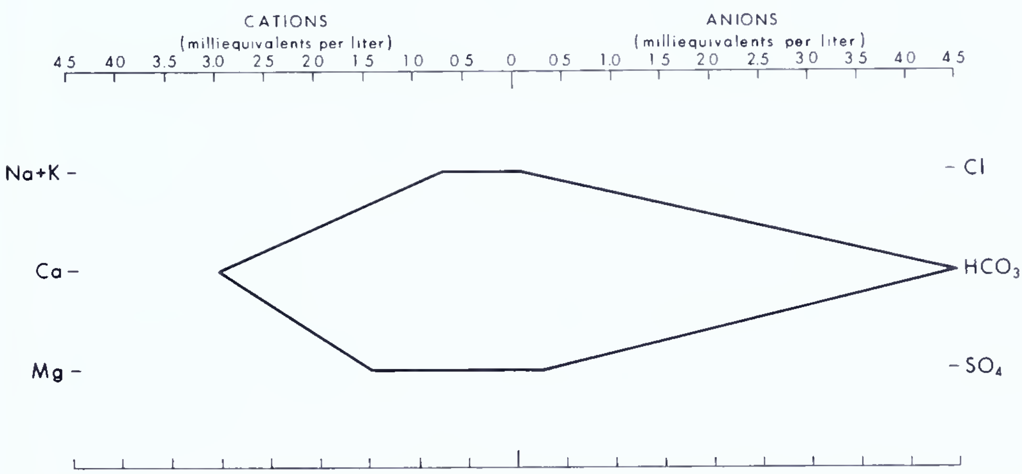


Figure 26. Stiff diagram of the median chemical character of groundwater from the Keyser and Tonoloway Formations, undivided.

Evaluation of the Aquifer

Sufficient quantities of groundwater may be developed from these formations for most uses, and some very large yields are possible. Failures should be infrequent, as only 11 percent of the reported yields were less than 5 gal/min.

The water is very hard and moderately high in dissolved solids and will require treatment for some uses.

WILLS CREEK FORMATION

Stratigraphy

The Wills Creek Formation consists of interbedded olive- and greenish-gray, calcareous and noncalcareous shale and argillaceous limestone. There are a few interbeds of grayish-red shale and gray, fine-grained sandstone. The upper part of the formation in the Altoona area consists of alternating layers of dolomite and noncalcareous siltstone. Reported thicknesses range from about 400 to 650 feet.

Water-Bearing Properties

Reported yields of 199 wells ranged from 1 to 360 gal/min. The median yields of domestic and nondomestic wells were 15 and 40 gal/min, respectively. Eighteen, or about 9 percent, of the wells had yields less than 5 gal/min and 21, or about 6 percent, had yields of 100 gal/min or more.

Well depths ranged from 18 to 495 feet. Slightly more than half were 100 feet or less, and 17 were deeper than 300 feet. The median depths for domestic and nondomestic wells were 100 and 137 feet, respectively.

As suggested by the depth data, water-bearing zones were most frequent from depths of 0 to 100 feet, averaging nearly one zone per 50-foot depth interval. The deepest reported zone was at 300 feet.

Water Quality

Eleven samples were collected for detailed analysis in the laboratory. One sample each exceeded recommended limits for dissolved solids and manganese and two samples exceeded the limit for iron. The water is predominantly a calcium-magnesium bicarbonate type, as shown in Figure 27.

The median hardness from 88 field analyses was about 12 grains per gallon and the median specific conductance was nearly 450 micromhos. These data indicate that the water is very hard and moderately high in dissolved solids.

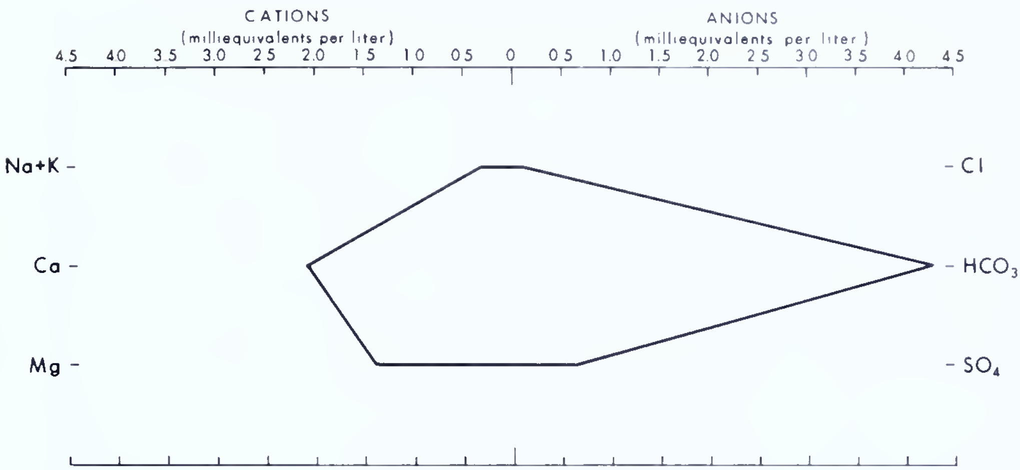


Figure 27. Stiff diagram of the median chemical character of groundwater from the Wills Creek Formation.

Evaluation of the Aquifer

The Wills Creek Formation will generally yield sufficient groundwater of acceptable quality for small to moderate supplies; some larger supplies are also possible, as one of four wells drilled for nondomestic purposes yielded 100 gal/min or more. The water is hard to very hard and requires treatment for some uses.

BLOOMSBURG AND MIFFLINTOWN FORMATIONS

Stratigraphy

The Bloomsburg Formation is predominantly grayish-red shale and mudstone with some interbeds of light-gray sandstone and limestone. Reported thicknesses range from 50 to 450 feet, and the units are generally thinnest in the west.

The Mifflintown Formation consists of dark-gray calcareous shale and many interbedded thin layers of limestone. Locally two contrasting lithologies can be recognized: a lower unit, which contains the characteristic Mifflintown lithology of interbedded shale and limestone; and an upper unit, which is predominantly thin- to medium-bedded limestone up to 225 feet thick. The formation ranges from 200 to 625 feet thick and is thinnest in the east.

Water-Bearing Properties

Figure 28 is a frequency plot of reported yields from domestic wells in the Bloomsburg and Mifflintown Formations. The Bloomsburg has somewhat

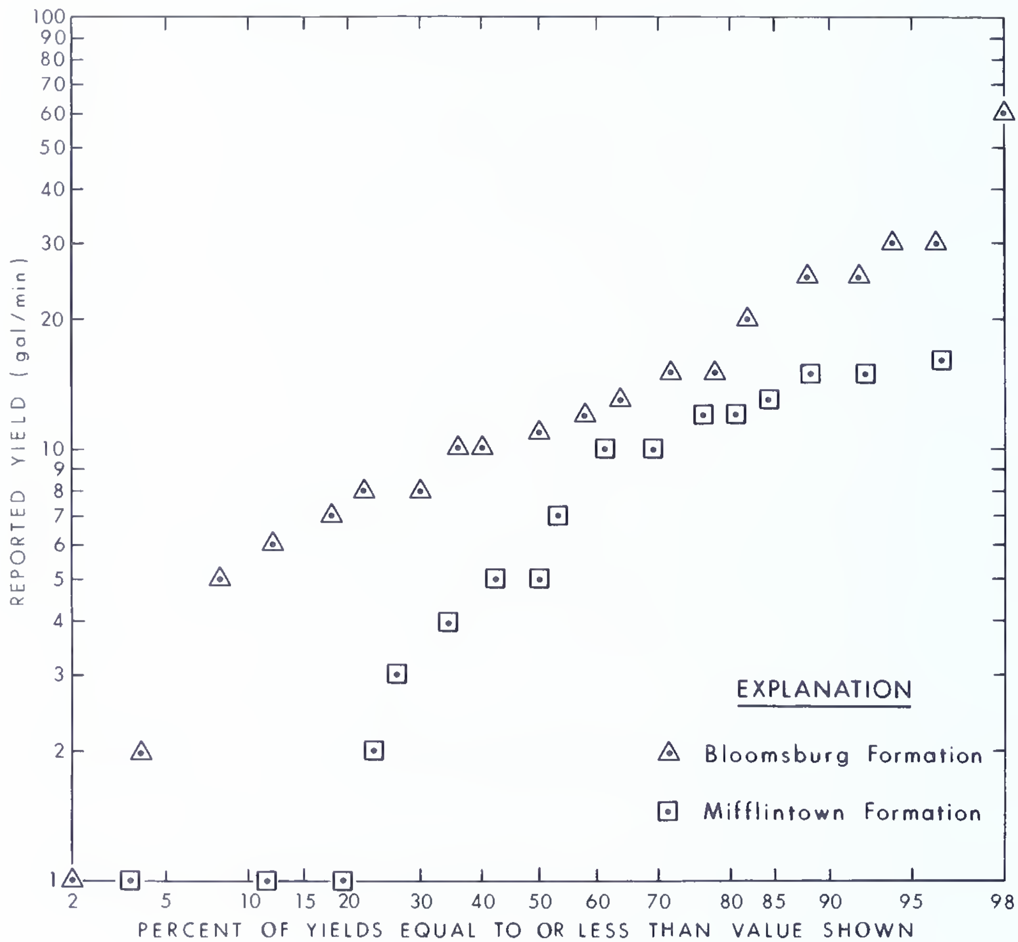


Figure 28. Percent frequency distribution of reported domestic-well yields from the Bloomsburg and Mifflintown Formations.

higher yields, as shown by the graphical separation of the data.

Reported yields of 118 wells ranged from 1 to 150 gal/min. The medians for domestic and nondomestic wells were 15 and 18 gal/min, respectively. Seventeen wells yielded less than 5 gal/min (about 14 percent), and a single well yielded more than 100 gal/min.

Reported depths of 132 wells ranged from 34 to 418 feet. Thirty-six wells were 100 feet or less deep and only one was deeper than 300 feet. The median depths for domestic and nondomestic wells were 145 and 250 feet, respectively.

Yielding-zone data from 60 wells indicated that most of the water-bearing openings are relatively shallow. However, zones appeared to be consistently abundant to a depth of 300 feet. The deepest reported zone was at 385 feet.

Water Quality

Four groundwater samples were collected from these formations. One sample had nitrates above mandatory limits for drinking water. In the remaining samples all of the constituents were at acceptable levels.

The median hardness from 62 field analyses was 6 grains per gallon and the median specific conductance was about 280 micromhos. This indicates that the water is moderately hard and comparatively low in dissolved solids.

Evaluation of the Aquifer

These rocks will generally yield sufficient groundwater for small to moderate supplies. Yields from the Bloomsburg Formation are slightly higher than those from the Mifflintown Formation. About 27 percent of the wells obtained an adequate amount of water for domestic use from depths of 100 feet or less, which suggests an abundance of shallow yielding zones. This, coupled with the ease of drilling in predominantly shale formations, should result in a relatively low cost for development of small water supplies in these formations.

CLINTON GROUP

Stratigraphy

The Clinton Group consists almost entirely of the Rose Hill Formation, which is light-gray and light-olive-gray shale containing some minor interbedded siltstone and sandstone. One or more grayish-red to reddish-black, hematitic sandstone and siltstone horizons are generally present. Hematitic sandstones form up to 45 percent of the Clinton Group in the east.

The Rose Hill Formation is overlain by the Keefer Formation, which is predominantly light- to dark-gray, locally hematitic sandstone. The Keefer attains a maximum thickness of about 38 feet in the Juniata River basin. Reported thicknesses for the Clinton Group range from about 575 to 950 feet.

Water-Bearing Properties

Reported yields of 58 wells ranged from 1 to 386 gal/min. The median yields for domestic and nondomestic wells were 10 and 20 gal/min, respectively. Eight wells yielded less than 5 gal/min and four had yields greater than 100 gal/min.

Well depths ranged from 50 to 555 feet. The median for 48 domestic wells was 151 feet and the median for 12 nondomestic wells was 192 feet. Fifteen wells were 100 feet or less deep and seven were deeper than 300 feet.

Water Quality

Three samples were collected from the Clinton Group for laboratory analysis. All of them exceeded recommended limits for manganese and a single sample had excessive iron.

The median hardness from 19 field analyses was 5 grains per gallon and the median specific conductance was 250 micromhos. These data indicate that the water is moderately hard and comparatively low in dissolved solids.

Evaluation of the Aquifer

The Clinton Group will, in general, yield sufficient water of acceptable quality for domestic and other uses requiring small to moderate supplies. High concentrations of iron and manganese are a frequent problem.

Large supplies (100 gal/min or more) are difficult to obtain owing to the lithologic character (predominantly shale) of the unit.

TUSCARORA, JUNIATA, AND BALD EAGLE FORMATIONS

Stratigraphy

The Tuscarora, Juniata, and Bald Eagle Formations are prominent ridge and upland bench formers throughout much of the basin.

The Tuscarora Formation generally consists of light- to medium-gray sandstone and minor interbedded shale. Thicknesses of this unit range from slightly less than 400 feet to at least 700 feet in the northern part of the Mifflintown quadrangle.

The Juniata Formation consists of brownish- to grayish-red sandstone, some siltstone, and shale. The sandstone ranges from fine to medium grained and is often crossbedded. Reported thicknesses increase from 850 feet in the west to about 1,500 to 1,700 feet in the east.

The Bald Eagle Formation is composed of gray to olive-gray and grayish-red, fine- to coarse-grained sandstone and some conglomerate. The unit is about 600 to 900 feet thick.

Evaluation of the Aquifers

Because these units generally underlie wooded ridges, there has been little attempt to develop groundwater from them. The few data that were obtained indicate that small supplies of soft groundwater are possible.

REEDSVILLE FORMATION

Stratigraphy

The Reedsville Formation consists of dark-gray, greenish-gray, and olive-gray shale with some siltstone and a few sandstone layers near the top. The

shale is fissile to thick bedded. In the northwestern part of the basin the underlying Antes Formation, primarily black calcareous shale, is combined with the Reedsville. The thickness of the Reedsville Formation ranges from 1,000 to about 2,000 feet.

Water-Bearing Properties

Reported yields of 38 wells ranged from 1 to 50 gal/min. The median yields for domestic and nondomestic wells were 12 and 20 gal/min, respectively. Only three wells had reported yields of less than 5 gal/min.

Well depths ranged from 31 to 435 feet. The median for both domestic and nondomestic wells was 130 feet. Twenty-six percent of the wells obtained sufficient quantities of water at depths of 100 feet or less, and about 17 percent had to be drilled deeper than 300 feet.

A limited amount of yielding-zone data indicates abundant zones in the 50- to 150-foot depth range and few deeper than 200 feet. The deepest reported zone was at 350 feet.

Water Quality

Four water samples were collected from the Reedsville Formation for laboratory analysis. Two samples exceeded recommended limits for iron and a single sample each exceeded limits for manganese and sulfate.

The median hardness and specific conductance from field analyses was about 5 grains per gallon (15 analyses) and 200 micromhos (13 analyses), respectively. These data indicate that the water from the Reedsville is moderately hard and relatively low in dissolved solids.

Evaluation of the Aquifer

The Reedsville Formation generally yields sufficient quantities of water of acceptable quality for small to moderate supplies. Excessive iron and manganese are a common problem and occasionally the water contains objectionable amounts of hydrogen sulfide.

COBURN FORMATION THROUGH LOYSBURG FORMATION

Stratigraphy

The interval from the Coburn Formation through the Loysburg Formation is a sequence of Middle to Upper Ordovician carbonate rocks approximately 1,000 feet thick. In descending order, the formations and lithologies that make up this stratigraphic section are as follows: Coburn Formation—medium-gray limestone; Salona Formation—very dark gray to black shaly limestone and calcareous shale; Nealmont Formation—medium-gray

fossiliferous limestone; Benner Formation—light- to dark-gray, thick-bedded limestone; Snyder Formation—light- to medium-gray limestone; Hatter Formation—medium-gray, argillaceous limestone; and Loysburg Formation—light- to medium-gray, medium-bedded limestone overlying laminated, alternating limestone, dolomitic limestone, and dolomite.

Water-Bearing Properties

Reported yields of 25 wells ranged from 1 to 25 gal/min. The median yield for domestic wells was 6 gal/min, and eight wells (about one third) had yields of less than 5 gal/min.

Reported depths of 27 wells ranged from 28 to 400 feet. Domestic wells had a median depth of 200 feet; five were less than 100 feet and four greater than 300 feet deep.

Water Quality

The two samples that were collected from these units for laboratory analysis had all constituents within recommended limits. Seven field analyses indicate that the water is hard (median of 10 grains per gallon) and moderately high in dissolved solids (specific conductance of 370 micromhos).

Evaluation of the Aquifer

Insufficient data are available to evaluate the maximum potential of these units. However, data from domestic wells suggest that small supplies of hard water can be developed, but that approximately one third will have yields less than 5 gal/min.

BELLEFONTE AND AXEMANN FORMATIONS

Stratigraphy

The Bellefonte Formation is generally medium- to thick-bedded, gray dolomite having minor amounts of chert and sandstone. Reported thicknesses for this unit average about 1,000 feet.

The underlying Axemann Formation, where recognized, is mainly limestone but contains a few thin layers of dolomite; it ranges between 50 and 200 feet in thickness.

Water-Bearing Properties

Reported yields of 36 wells ranged between 1 and 250 gal/min. The medians for domestic and nondomestic wells were 10 and 30 gal/min, respectively. Only three wells had reported yields of less than 5 gal/min, and a single well had a yield greater than 100 gal/min.

Reported depths ranged between 42 and 500 feet. The median depth for domestic wells was 156 feet. Ten wells obtained the desired yield at depths of less than 100 feet and eight had to be drilled deeper than 300 feet.

Water Quality

Nine samples were collected from these formations for laboratory analysis. One sample each exceeded mandatory limits for chromium and nitrate. About 25 percent of the samples had dissolved solids above recommended levels. The water is a calcium-magnesium bicarbonate type, as shown in Figure 29.

The median hardness and specific conductance from 16 field analyses were 18 grains per gallon and about 610 micromhos, respectively. Groundwater from these formations is thus very hard and high in dissolved solids.

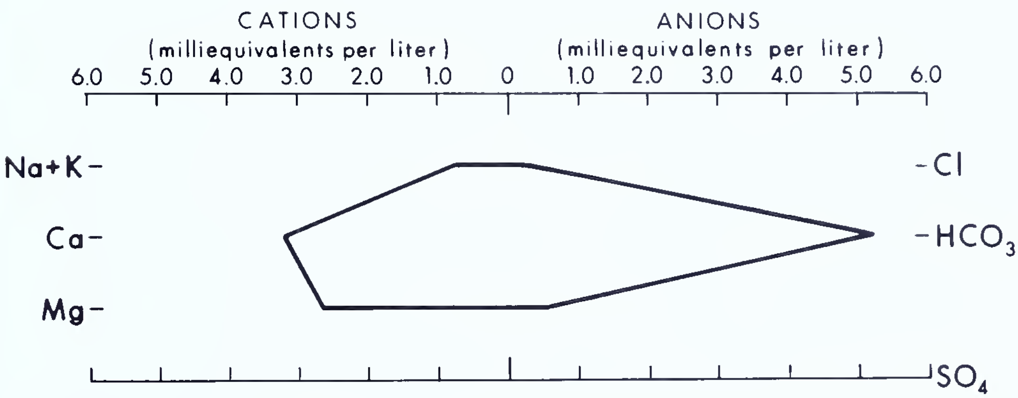


Figure 29. Stiff diagram of the median chemical character of groundwater from the Bellefonte and Axemann Formations, undivided.

Evaluation of the Aquifer

Comparatively large supplies of groundwater are obtainable from these formations, and there should be few failures when attempting to obtain domestic supplies. However, the water is very hard and high in dissolved solids and will require treatment for most uses.

NITTANY AND STONEHENGE/LARKE FORMATIONS

Stratigraphy

The Nittany Formation is primarily medium- to dark-gray, thick-bedded dolomite containing chert and siliceous oolites. Reported thicknesses range from 850 to 1,000 feet.

The Stonehenge Formation consists of 200 to 250 feet of medium-gray, medium-bedded to laminated, oolitic limestone, and is laterally equivalent to the medium- to dark-gray, coarsely crystalline dolomite of the Larke Formation.

Water-Bearing Properties

Reported yields of 36 wells ranged from 3 to 150 gal/min. The median yields of domestic and nondomestic wells were 15 and 26 gal/min, respectively. Only one well yielded less than 5 gal/min and four yielded 100 gal/min or more.

The median well depths were 173 feet for domestic wells and 194 feet for nondomestic wells. Depths of 38 wells ranged from 37 to 456 feet; seven were less than 100 feet deep and six were greater than 300 feet deep.

Water Quality

Eight samples were collected from these formations for laboratory analysis. All results were within the recommended drinking-water limits for the measured constituents.

Data from ten field analyses indicate that the water is very hard (median of 13 grains per gallon) and moderately high in dissolved solids (median specific conductance of about 550 micromhos).

Evaluation of the Aquifer

These formations should yield small to moderate supplies of very hard groundwater. About 40 percent of the wells drilled for large supplies should yield 100 gal/min or more.

GATESBURG FORMATION

Stratigraphy

The Gatesburg Formation consists primarily of gray dolomite, limestone, and sandstone. Five members of this formation are recognized in the basin. They are, in descending order: Mines Member—gray dolomite and some chert; upper sandstone member—cyclic repetitions of sandstone and dolomite; Ore Hill Member—laminated to massive limestone and dolomite; lower sandstone member—cyclic repetitions of sandstone and dolomite; and Stacy Member—thick-bedded, crystalline dolomite. The Gatesburg is about 1,475 to 1,750 feet thick.

Water-Bearing Properties

Reported yields of 39 wells ranged from 1 to 300 gal/min. The median yield for 35 domestic wells was 9 gal/min, and eight wells produced less than 5 gal/min. Four nondomestic wells yielded more than 100 gal/min.

Well depths ranged from 100 to 571 feet and the median was 264 feet for domestic wells. The median for four nondomestic wells was 452 feet. Sixteen wells, or over 40 percent, had to be drilled 300 or more feet deep to attain the desired yield.

Water Quality

Six groundwater samples were collected from the Gatesburg Formation for laboratory analysis. Two samples exceeded drinking-water standards for iron, one sample had excessive amounts of chromium, and one sample exceeded standards for manganese. The water is a calcium-magnesium bicarbonate type, as shown in Figure 30.

The median hardness from 16 field analyses was 11 grains per gallon; the median specific conductance was 431 micromhos. Groundwater from the Gatesburg is very hard and relatively high in dissolved solids.

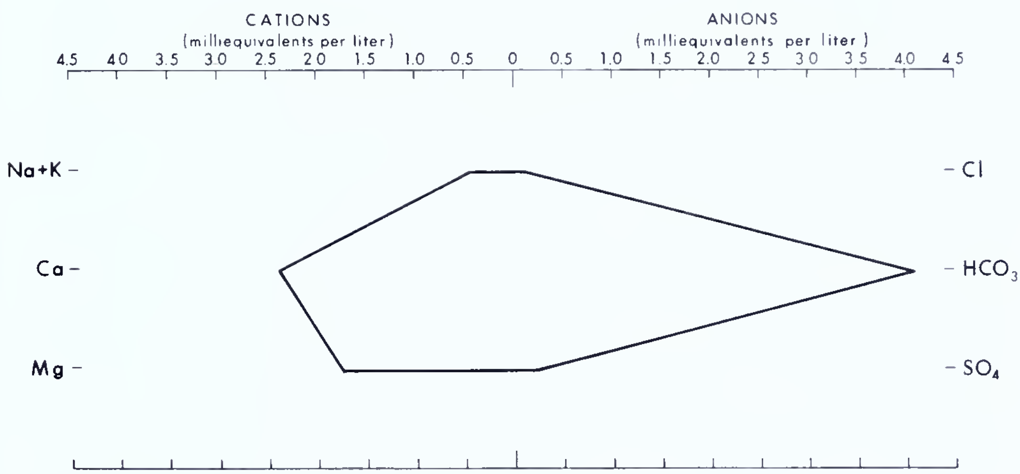


Figure 30. Stiff diagram of the median chemical character of groundwater from the Gatesburg through Warrior Formations, undivided.

Evaluation of the Aquifer

The Gatesburg Formation should yield sufficient quantities of very hard water for most uses. Wells will, on the average, be deeper, have more casing, and have a greater depth to water than wells from any other rock unit in the basin (see Table 14).

WARRIOR, PLEASANT HILL, AND WAYNESBORO FORMATIONS

Stratigraphy

These three Lower Cambrian rock units have a rather limited areal extent within the Juniata River basin and thus are combined in this discussion.

The Warrior Formation consists of gray, thin- to medium-bedded limestone interbedded with dolomite and some sandstone. The underlying Pleasant Hill Formation is gray, thin-bedded, argillaceous limestone interbedded with shale, siltstone, and sandstone. The basal Waynesboro Formation consists of greenish-gray and grayish-purple shale interbedded with greenish-gray sandstone and conglomerate.

Water-Bearing Properties and Evaluation of Aquifers

Only eight wells were inventoried and only limited water-quality data were obtained from these formations. The results are presented in Tables 14 and 15 but are insufficient to adequately characterize the water-bearing properties of these units.

Based upon lithologic considerations, these units will probably yield small to moderate supplies of hard water.

MANAGEMENT OF WATER SUPPLIES

GROUNDWATER QUANTITY MANAGEMENT

No sizable areas were identified in the Juniata River basin where groundwater levels are progressively declining as a result of excessive groundwater withdrawals. Only a small fraction of the total available groundwater is being used.

Most quantity problems involve localized overpumping of a single well or well field. These types of problems can be alleviated either by adding wells so that pumpage is spread over a larger area, by utilizing another source of supply to allow water levels to recover, or by reducing the water demand.

Seasonal water shortages occur in water systems that have not developed sufficient excess capacity to enable supplies to be maintained through droughts of short to moderate length.

The analysis of annual streamflow indicated that, on the average, a groundwater discharge of at least 250 (gal/min)/mi^2 could be expected to occur approximately 90 percent of the time. If only 25 percent of this discharge (a conservative amount) were developed by widely spaced wells, 306 mgd could be obtained without seriously affecting groundwater levels or reducing streamflow. This is almost 12 times the estimated groundwater use in the basin in 1970.

The Susquehanna River Basin Commission is the only governmental agency that presently has enabling legislation allowing it to regulate some groundwater withdrawals. In September of 1976 the Commission adopted a regulation requiring compensation for certain consumptive water uses during low-streamflow periods. The purposes of the regulation are protection of public health, stream-quality control, economic development, protection

of fisheries, recreation, dilution and abatement of pollution, the prevention of undue salinity, and protection of the Chesapeake Bay.

Withdrawals from surface or groundwater of 100,000 gallons per day or more, from which more than 20,000 gallons are used consumptively, are covered by this regulation.

In addition, in the fall of 1978 the Commission adopted a policy on water conservation which sets forth project-review criteria through which the Commission will evaluate any new or requested increase for the withdrawal of water from a surface or groundwater resource for public water supply utilities, industries, and irrigational usage.

GROUNDWATER QUALITY MANAGEMENT

The quality of groundwater in the Juniata River basin is generally acceptable for most uses. Most man-induced water-quality problems are local in extent and can be minimized by constructing wells in such a way to preclude the possibility of surface water entering the well. Such factors as adequate casing lengths, wall thickness, and material, in conjunction with adequate formation sealing material such as cement grout, must be considered when constructing a well.

Point sources of groundwater contamination must be identified and eliminated or their effects minimized through clean-up operations.

Nitrate contamination of groundwater as a result of heavy fertilization of crop lands appears to be a problem in some of the valleys underlain by carbonate rocks. Agricultural practices that will minimize this problem need to be developed in these areas.

CONCLUSIONS

Groundwater use in the Juniata River basin was about 26 mgd in 1970. State Water Plan projections are for a 28 percent increase in water use by 1990, and most of the increase will come from groundwater.

The basin has an abundant water resource resulting from an average of approximately 37 inches of precipitation. Total runoff accounts for about 40 to 46 percent of annual precipitation, or about 14.6 to 16.9 inches. Groundwater flow averages 66 percent of total runoff. Evapotranspiration averages about 20.8 inches, or 57 percent, of precipitation.

Groundwater levels are at a median depth of 15 feet in valleys, 37 feet under hillsides, and 66 feet under hilltops. Bedrock units that consist primarily of shale have the shallowest median water levels.

Lithology, topography, and geologic structure were found to influence the depth, size, and abundance of water-bearing zones and, thus, well yields. Rocks that consist primarily of limestone or dolomite have the highest well yields, followed by sandstone and shale in that order. Yields of val-

ley wells are two to three times higher than yields of wells located in other topographic settings. Geologic structures that have an important influence on well yields are faults, folds, fractures, and bedrock dip.

Groundwater quality is generally adequate for most uses. Major differences in chemistry occur between water from primarily calcareous rock units and water from noncalcareous units.

Iron and manganese are the natural constituents in groundwater that most commonly exceed recommended limits; more than 35 percent of the inventoried wells have high amounts of one or both of them. The presence of these constituents can result in the staining of bathroom fixtures, impart a brownish color to laundered goods, and affect the taste of beverages such as tea and coffee. Addition of an oxidizing agent to the water, followed by filtration, is the most common method used to remove iron and manganese from water supplies.

Major sources of groundwater contamination are bacterial organisms from sewage, petroleum products from buried storage tanks, excessive nitrates from improper agricultural practices, landfill leachate, and acid mine drainage.

Large supplies of groundwater can be developed from the lower part of the Conemaugh Group through the Pottsville Group, and domestic supplies are possible throughout. High levels of iron and manganese create a persistent problem.

The Mauch Chunk Formation yields sufficient water of acceptable quality for domestic use and other uses requiring moderate supplies. Large supplies (100 gal/min or more) are difficult to obtain.

The sandstones within the Pocono Formation, Burgoon Sandstone, and Rockwell Formation are primarily ridge formers and as such have low aquifer potential.

Small to moderate supplies are possible from the Catskill Formation, but large supplies are difficult to obtain. Forty percent of the wells produce water having objectionable amounts of iron and manganese.

The Foreknobs, Scherr, and Lock Haven Formations generally yield sufficient water for small supplies; however, a large percentage of domestic supplies may be marginal for some uses (about 25 percent produce less than 5 gal/min).

The Trimmers Rock, Brallier, and Harrell Formations have the poorest yielding potential of all of the rocks in the basin. Although most attempts at obtaining domestic supplies can be successful, over a third have marginal yields (less than 5 gal/min) for some uses.

The Hamilton Group yields small to moderate supplies. Over half of the wells produce water containing objectionable amounts of iron and manganese, and many produce water containing hydrogen sulfide.

Small to large supplies of hard water are obtainable from the Onondaga

and Old Port Formations. Twenty-five percent of the wells drilled in these formations for nondomestic purposes had yields of 150 gal/min or more.

The Keyser and Tonoloway Formations yield sufficient quantities of water for most uses, and some very large yields are possible. The water is very hard and moderately high in dissolved solids.

The Wills Creek Formation generally yields sufficient groundwater of acceptable quality for small to moderate supplies; some larger supplies are also possible, as one of four wells drilled for nondomestic use yielded 100 gal/min or more.

Small to moderate yields from comparatively shallow depths are possible from the Bloomsburg and Mifflintown Formations. The water is moderately hard.

The Clinton Group yields sufficient water for domestic and other small- to moderate-quantity uses. High concentrations of iron and manganese are a frequent problem.

The Tuscarora, Juniata, and Bald Eagle Formations generally underlie wooded ridges, and there has been little attempt to develop groundwater from them. However, small supplies of soft groundwater should be possible.

Excessive iron and manganese and objectionable amounts of hydrogen sulfide are a frequent problem in water from the Reedsville Formation. Small to moderate supplies should be available.

The Coburn through Loysburg Formations yield small supplies of hard water. The maximum yielding potential of these units has not been tested.

The Bellefonte and Axemann Formations produce comparatively large supplies of groundwater; there should be few failures when attempts are made to obtain domestic supplies. The water is very hard and high in dissolved solids and thus requires treatment for most uses.

The Nittany and Stonehenge/Larke Formations yield small to moderate supplies of very hard groundwater. About 40 percent of the wells drilled for large supplies should yield 100 gal/min or more.

The Gatesburg Formation should yield sufficient quantities of very hard water for most uses.

Based primarily upon lithologic considerations, the Warrior, Pleasant Hill, and Waynesboro Formations can probably yield small to moderate supplies of hard water.

SOURCES OF INFORMATION ABOUT WATER

A variety of information on water supplies is available from the government agencies listed below. When requesting information it is important to give an accurate location of the site for which information is desired.

The Bureau of Topographic and Geologic Survey, Department of Environmental Resources, Harrisburg, has information on the geology of the Juniata River basin and has published reports that describe in detail the rocks that underlie the area. Well drillers' logs and reports on new wells that have been drilled are also available.

The Bureau of Community Environmental Control, Pennsylvania Department of Environmental Resources, Harrisburg, can supply information on well construction requirements, biological reports on well water, and data on the chemical quality of groundwater. The Bureau, through various regional offices, tests water samples for bacterial pollution, and can also advise on effective corrective measures when pollution is reported.

The Division of State Water Plan, Bureau of Water Resources Management, Pennsylvania Department of Environmental Resources, Harrisburg, has information on stream discharges, floods, reservoir requirements, and power plant discharges.

The Public Utility Commission, Bureau of Rates and Research, has information on some municipal water supplies, including source, average daily use, total annual use, and estimated future needs.

The U. S. Geological Survey, Federal Building, Harrisburg, has data on wells, springs, and streams, and on the chemical quality of water.

Local well drillers and pump installers can usually provide prices and suggest the type of equipment needed to develop a water supply. They can also suggest the proper well diameter for the necessary pumping equipment. Pump installers can supply information concerning the size of the pump, depth of the pump setting, and pressure-tank capacity.

If the chemical analysis of the well water indicates that treatment is necessary, commercial water-treatment companies can provide the necessary information and equipment. Equipment for water treatment can be purchased or rented, and it will generally be serviced by the supplier if desired.

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GLOSSARY

Aquifer. A formation that yields significant quantities of water to wells and springs.

Arenaceous. Pertaining to rocks that have been derived from sand or that contain sand.

Argillaceous. Pertaining to rocks composed of clay or having a notable proportion of clay in their composition.

Base flow. Discharge entering stream channels as flow from the groundwater reservoir; the fair-weather flow of streams.

Carbonate rocks. Rocks composed dominantly of carbonate minerals. Limestone and dolomite are the most common rocks of this type.

Dip of beds. The angle at which the formation or bed is inclined from the horizontal, measured at a right angle to the strike or trend of the formation or bed.

Discharge, groundwater. The process by which water is removed from the saturated zone; also the quantity of water removed.

Drawdown. The lowering of the water level in a well caused by pumping.

Evapotranspiration. Water withdrawn from a land area by direct evaporation from water surfaces and moist soil and by plant transpiration.

Fault. A fracture or fracture zone along which there has been displacement of the two sides relative to each other. The displacement may be a few inches or many miles.

Formation. A fundamental unit in rock stratigraphic classification. It is a body of rock characterized by lithologic homogeneity; it is prevailingly tabular and is mappable at the earth's surface or traceable in the subsurface.

Fracture. A break in the rock.

Groundwater reservoir. An aquifer or a group of related aquifers under a given area.

Hardness. A chemical property of water, caused mostly by the presence of calcium and magnesium, which increases the amount of soap needed to produce a lather. Water that has a hardness, calculated as grains per gallon of calcium carbonate, less than 3.5 is soft; between 3.5 and 7.0 is moderately hard; between 7.1 and 10.5 is hard; and greater than 10.5 is very hard. Values may be converted to milligrams per liter by multiplying by 17. Hardness values used in this report were determined in the field by use of a Calgon Speedy kit for testing water hardness. (Use of a brand name is for identification purposes only and does not imply endorsement by the Pennsylvania Geological Survey.)

Hematitic. Pertaining to rocks containing the mineral hematite, Fe_2O_3, the principal ore of iron.

Igneous rock. A rock that solidified from molten material.

Metamorphic rock. A rock derived from preexisting rocks by change in mineral composition or texture caused by heat and pressure.

Overdraft. An excessive lowering of the water level or artesian head in an aquifer caused by excessive withdrawal.

Permeability. The capacity of a material to transmit a fluid.

pH. The negative logarithm of the hydrogen-ion concentration. A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote alkaline solutions; values lower than 7.0 indicate acidic solutions.

Porosity. The ratio of the volume of interstices in a rock to its total volume, expressed as a percentage.

Primary openings. Openings or voids existing when the rock was formed. In sedimentary rocks, openings result from the shape and nature of the original sediment and the way the particles are fitted together.

Recharge, groundwater. The process by which water is added to the saturated zone; also the quantity of water added.

Runoff. That part of the precipitation that appears in streams. It is the same as streamflow unaffected by diversions, dams, or other works of man.

Saturated zone. The zone in which interconnected interstices are saturated with water.

Secondary openings. Voids produced in rocks subsequent to their formation by solution, weathering, or breaks in the rock.

Specific capacity. The yield of the well, in gallons per minute, divided by the drawdown of water level in the well, in feet.

Specific conductance. A measure of the capacity of water to conduct an electrical current. It varies with concentration and degree of ionization of the constituents.

Stiff diagram. A diagram used to show water composition differences or similarities. The width of the pattern is an approximate indication of the total ionic content.

Stream-gaging station. A gaging station where a record of discharge of a stream is obtained. Within the U. S. Geological Survey this term is used only for those gaging stations where a continuous record of discharge is obtained.

Transpiration. The process by which vapor escapes from the living plant, principally the leaves, and enters the atmosphere.

Water table. The upper surface of the zone of saturation, or that zone in which openings in permeable rocks are filled with water.

TABLE 15. CHEMICAL ANALYSES OF GROUNDWATER

(Results are in milligrams per liter unless otherwise indicated)

Well number	Date of collection	Aquifer[1]	pH	Arsenic (As)	Aluminum (Al)	Alkalinity ($CaCO_3$)	Cadmium (Cd)	Calcium (Ca)	Chloride (Cl)	Chromium (Cr)	Dissolved solids	Fluoride (F)	Hardness ($CaCO_3$)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Magnesium (Mg)	Nickel (Ni)	NH_3, as N	NO_2, as N	NO_3, as N	Potassium (K)	Sodium (Na)	Sulfate (SO_4)	Total organic carbon	Zinc (Zn)
BEDFORD COUNTY																										
Bd-209	8/12/80	Obh	7.3	<.01	.02	116	<.003	34.3	3.0	<.01	388	.29	175	1.49	<.05	.46	21	.01	.29	.002	.02	.76	27.8	140	---	<.01
212	3/13/80	Oh	7.8	<.01	.02	198	<.003	38.3	3.0	.06	532	.16	130	.06	<.05	.08	9.8	.02	.29	.022	.08	.22	30.5	30	---	.02
230	8/13/80	Of	7.2	<.01	.01	100	<.003	20	6.0	<.01	208	.14	88	.73	<.05	.27	10	.02	.08	.002	.02	.98	8.7	20	---	.05
232	8/13/80	Of	7.3	<.01	.02	124	<.003	22.8	1.0	<.01	216	.18	110	.23	<.05	.11	13.4	.02	.02	.002	.06	1.16	5.61	20	---	.07
236	8/13/80	Ock	7.5	<.01	.05	104	<.003	14.3	1.0	<.01	190	.13	82	.07	<.05	.13	8.6	.01	.02	.002	.16	.94	6.38	15	---	.31
245	8/14/80	Ooo	7.5	<.01	.05	108	<.003	25.7	1.0	<.01	180	<.10	100	.04	<.05	.01	6.7	.03	.01	.002	.02	.64	.44	15	---	.01
246	8/14/80	Swc	7.8	<.01	.02	186	<.003	41.2	13	<.01	306	<.10	190	.03	<.05	.01	17.7	.01	.01	.002	.92	.96	3.96	25	---	.01
251	8/12/80	Swc	7.4	<.01	.05	320	<.003	103	14	.01	552	.13	484	.03	<.05	.01	32	.01	.02	.002	1.12	2.42	1.56	60	---	4.95
253	8/13/80	OSkt	7.6	<.01	.13	310	<.003	106	12	.06	486	.15	484	.17	<.05	.01	18.7	.04	.02	.002	2.2	.84	3.3	25	---	.02
260	8/13/80	Obh	7.3	<.01	.02	142	<.003	33.4	6.0	.01	308	.16	150	.09	<.05	.06	15.2	.02	.06	.006	.50	3.56	11.0	45	---	.02
266	8/14/80	Os	7.5	<.01	.08	142	<.003	29.5	3.0	<.01	216	.15	114	.02	<.05	.06	7.9	.02	.03	.002	.08	.94	9.46	15	---	.01
270	8/19/80	Swc	7.9	<.01	.05	180	<.003	40.5	<1.0	<.01	236	.21	152	.28	<.05	.01	14	<.01	.28	.058	.04	3.32	5.4	5	---	.01
279	8/20/80	Ock	7.8	<.01	.04	92	<.003	24	18	<.01	220	<.10	102	.02	<.05	.03	11.2	<.01	.01	.006	.57	.96	---	15	---	.01
281	8/20/80	Of	6.6	<.01	.16	28	<.003	2.5	<1.0	<.01	82	<.10	25	.22	<.05	.08	2.5	<.01	.01	.002	.10	.64	7.37	<5	---	.04
285	8/20/80	Ock	7.7	<.01	.06	110	<.003	19.2	1.0	<.01	146	.11	78	.03	<.05	.03	8.9	<.01	.01	.004	.14	.82	6.05	<5	---	.47
286	8/20/80	Ock	7.9	.04	.05	88	<.003	16.9	3.0	<.01	136	<.10	62	.02	<.05	.01	5.9	<.01	.01	.002	1.92	.82	8.58	<5	---	.02
307	8/19/80	Єg	7.8	<.01	.92	204	<.003	42.4	7.0	.07	276	<.10	254	1.85	<.05	.02	25.2	.02	.01	.002	6.82	1.14	2.09	<5	---	.01
310	8/20/80	Oba	7.4	<.01	.04	360	<.003	96.4	18	.05	570	<.10	384	.03	<.05	.01	36.3	.02	.01	.002	10.1	5.72	5.72	30	---	.01
313	8/20/80	Ons	7.5	<.01	.03	250	<.003	60.5	33	.04	476	<.10	354	.05	<.05	.01	33.7	.01	.01	.002	1.98	.94	.99	55	---	4.68
314	8/20/80	Oba	7.4	<.01	.04	290	<.003	70.4	33	.04	450	<.10	284	.02	<.05	.01	21.1	.01	.01	.002	7.92	4.34	25.2	25	---	.02
317	8/21/80	Єw	7.4	<.01	.03	170	<.003	38.2	20	.05	300	<.10	182	.09	<.05	.01	20.6	<.01	.01	.002	.84	1.98	9.02	<5	---	.01
329	8/19/80	Or	7.6	<.01	.09	66	<.003	14.5	<1.0	<.01	124	.12	46	.12	<.05	.01	4.1	<.01	.01	.006	.19	.86	3.74	<5	---	.27
332	8/20/80	Oba	8.0	<.01	.04	244	<.003	56.5	8.0	<.01	370	.12	254	.02	<.05	<.01	32.3	<.01	.01	.096	7.16	1.06	1.32	15	---	.01
338	8/20/80	OSkt	7.6	<.01	.02	224	<.003	80.8	4.0	<.01	302	.11	242	.09	<.05	.01	9.7	<.01	.01	.002	2.2	.92	1.10	15	---	.01
341	8/21/80	Obh	7.4	<.01	.19	150	<.003	51.3	46	<.01	334	.12	188	1.06	<.05	.56	8.3	<.01	.18	.002	.02	.66	13.5	10	---	<.01
347	8/26/80	Ooo	7.1	<.01	<.01	82	<.003	27.8	1.0	.01	16	<.10	60	.01	<.05	.01	0.6	<.01	.01	.002	.74	.64	1.21	15	---	.02
349	8/26/80	Oh	7.6	<.01	.01	244	<.003	73.8	20	.01	414	.12	264	.55	<.05	.12	21.4	<.01	.19	.002	.12	1.16	8.36	35	---	.01
353	8/26/80	Ock	7.6	<.01	.01	104	<.003	17	3.0	<.01	166	.12	81	.04	<.05	<.01	7.7	<.01	.01	.004	.68	1.14	8.14	20	---	.01
354	8/27/80	Ock	6.5	<.01	.02	34	<.003	8.7	8.0	<.01	128	<.10	44	.04	<.05	.01	3.8	<.01	.01	.004	1.5	1.36	4.62	20	---	.01
368	8/28/80	Os	7.1	<.01	.05	98	<.003	24	6.0	.03	176	.14	90	.04	<.05	.05	6.4	.02	.01	.002	.32	.54	8.03	30	---	.01
374	9/16/80	Pc	5.6	<.01	.14	16	<.003	109	2.0	.04	1926	.12	792	98.6	<.05	4.58	75	.22	.96	.002	.02	14.1	190	1200	---	2.05
388	8/27/80	Єg	7.7	<.01	.05	280	<.003	55.3	9.0	.01	400	<.10	278	.04	.054	.01	35.8	<.01	.01	.002	1.3	1.08	23.1	65	---	.01
389	8/27/80	Єg	7.6	<.01	.03	192	<.003	39.9	4.0	<.01	248	.24	200	.02	<.05	.01	17	.01	.01	.002	1.54	1.22	1.21	30	---	.62
397	8/27/80	OSkt	7.7	<.01	.09	104	<.003	40.2	2.0	.01	146	<.10	99	.09	<.05	.02	1.6	<.01	.01	.002	.40	.64	1.06	15	---	.01
405	8/27/80	Of	7.8	<.01	.02	144	<.003	98.0	26	.01	526	.17	246	.10	<.05	.05	6.1	.01	.03	.002	.04	1.32	43	180	---	.07
409	8/27/80	Ock	8.7	<.01	.04	116	<.003	2.6	3.0	.01	142	.12	< 20	.07	<.05	.01	1.0	<.01	.01	.002	.10	.54	44.6	25	---	.36
425	9/17/80	Doo	7.1	<.01	.10	108	<.003	227	4.0	.02	3038	1.2	1764	.19	<.05	.03	165	.02	.17	.002	.10	1.18	11.1	1710	---	.83
426	8/28/80	Os	6.8	<.01	.04	64	<.003	6.5	1.0	<.01	116	.14	42	1.95	<.05	.39	5.7	<.01	.02	.002	.02	.54	6.38	10	---	.31

Bd-435	9/12/80	Ock	7.2	<.01	.05	88	<.003	15.2	1.0	.01	108	<.10	55	.01	<.05	<.01	7.1	<.01	.01	.002	.22	.96	6.6	5	---	.33
457	9/17/80	Pc	6.4	<.01	.07	80	<.003	49.4	2.0	.01	324	.12	173	9.89	<.05	.62	12.9	.03	.19	.004	.02	1.12	1.28	115	---	.20
477	9/17/80	Ock	7.3	<.01	.02	146	<.003	36	2.0	.01	330	.12	144	.08	<.05	.06	12.6	.01	.01	.002	.04	1.36	13.4	45	---	<.01
484	9/18/80	OSkt	7.1	<.01	.05	256	<.003	77.5	4.0	.01	330	.18	270	.02	<.05	.01	18.6	<.01	.01	.002	2.42	.92	.86	25	---	2.86
485	9/18/80	Swc	7.7	<.01	.08	262	<.003	75.8	17	.01	376	.11	386	.08	<.05	.01	37.7	<.01	.02	.004	.10	1.38	1.22	65	---	.01
489	9/18/80	Єg	7.3	<.01	.03	242	<.003	50.7	1.0	.01	254	<.10	210	.01	<.05	.01	28.1	.01	.01	.002	.44	.84	.54	10	---	.02
BLAIR COUNTY																										
Ba-150	6/04/80	Єg	7.3	<.01	.02	250	<.003	44.6	3.0	.01	306	<.10	240	.03	<.05	<.01	26.1	.01	.01	<.002	2.64	<10	<10	15	1.0	.89
154	6/10/80	Ooo	7.0	<.01	.12	262	<.003	82.2	5.0	.01	354	.12	220	.40	<.05	.01	16.9	.01	.01	.004	2.28	<10	<10	50	7.0	.42
162	6/11/80	Obh	7.0	.023	.04	146	<.003	22.7	2.0	<.01	248	.37	97	.64	<.05	.04	9.2	.01	.01	.004	.30	<10	26.9	30	<1.0	.11
167	6/17/80	Obh	7.5	<.01	.07	222	<.003	25.6	1.0	<.01	158	<.10	81	.03	<.05	.04	25.6	.01	.17	.002	.02	<10	54.8	15	2.0	.01
178	6/04/80	Ock	7.4	<.01	.10	190	<.003	45	32	<.01	300	.15	212	.27	<.05	.08	21.8	<.01	.12	<.002	<.02	<10	<10	35	7.0	<.01
179	6/04/80	Ock	7.4	<.01	.05	224	<.003	38.5	1.0	<.01	270	.19	180	.03	<.05	.01	18	<.01	.01	.002	.02	<10	14.6	15	2.0	2.27
183	6/04/80	Os	7.6	<.01	.04	162	<.003	24.6	2.0	<.01	220	.27	97	.04	<.05	.04	6.9	<.01	.01	.004	.10	<10	35.2	25	3.0	.01
184	6/05/80	Os	7.4	<.01	.06	164	<.003	32.5	1.0	.02	232	.24	128	.05	<.05	.06	10.4	<.01	.10	.006	.07	<10	20.1	25	<1.0	.02
203	6/03/80	Oh	7.5	<.01	.06	218	<.003	77.8	84	.01	486	<.10	264	.60	<.05	.30	20.8	.01	.23	<.002	<.02	<10	18	40	3.0	.08
204	6/03/80	Oh	7.3	<.01	.07	164	<.003	37.8	28	.01	264	<.10	152	2.36	<.05	.73	8.6	<.01	.24	<.002	<.02	<10	22.9	10	3.0	.04
223	6/10/80	Oba	7.1	<.01	<.01	264	<.003	60.1	7.0	<.01	380	.12	264	.03	<.05	<.01	36.5	<.01	.02	.004	5.06	<10	<10	30	11.0	.02
230	6/17/80	Obh	7.3	<.01	.09	190	<.003	38.1	3.0	<.01	224	.23	188	.19	<.05	.14	38.1	<.01	.10	.004	.02	<10	<10	40	1.0	<.01
248	6/11/80	Ons	7.0	<.01	.02	188	<.003	40.4	7.0	<.01	280	.10	196	.02	<.05	.01	22.5	.01	.01	.336	6.38	<10	<10	10	2.0	.61
254	6/16/80	Єg	7.3	<.01	.14	136	<.003	47.9	3.0	<.01	96	<.10	130	.34	<.05	.03	3.6	<.01	.01	.002	2.64	<10	<10	5	<1.0	.13
263	6/17/80	Ock	6.8	<.01	.08	78	<.003	13.1	2.0	<.01	124	.12	66	.11	<.05	.01	13.1	<.01	.02	.002	.02	<10	<10	5	<1.0	.71
265	6/18/80	Ock	6.8	<.01	.04	74	<.003	13.8	2.0	<.01	136	.14	58	.43	<.05	.12	5.5	<.01	.11	.002	.02	<10	<10	20	6.0	.18
270	7/02/80	Oba	7.2	<.01	.03	322	<.003	78.2	2.0	<.01	452	.26	352	<.01	<.05	<.01	43.3	<.01	.01	.002	5.06	1.24	2.2	30	10	6.00
272	7/02/80	Ons	7.7	<.01	.02	206	<.003	46.2	4.0	<.01	308	<.10	200	.13	<.05	<.01	26.2	<.01	.01	.002	5.72	1.12	.88	5	3.0	<.01
276	6/18/80	OSkt	7.2	<.01	.01	294	<.003	92.9	5.0	<.01	320	.26	348	.02	<.05	.01	19.4	<.01	.01	.01	4.83	<10	<10	5	2.0	.82
282	7/02/80	Obh	7.1	<.01	.02	98	<.003	14.9	3.0	<.01	162	.29	72	.25	<.05	.31	9.5	<.01	.08	.002	.02	1.08	15.1	15	3.0	<.01
291	7/01/80	Oh	7.6	<.01	.07	180	<.003	63.7	2.0	.02	254	.34	188	.02	<.05	<.01	12.1	<.01	.01	.002	1.84	.86	.55	20	4.0	.09
293	7/02/80	Oh	8.0	.028	.05	172	<.003	23.1	50	.01	276	.40	71	.11	<.05	.09	4.9	.04	.45	.002	.02	1.38	62.9	15	3.0	<.01
297	7/08/80	Ons	7.4	<.01	.04	172	<.003	45.6	12	<.01	264	<.10	196	.02	<.05	<.01	20.5	<.01	.01	.012	8.81	1.30	1.87	20	4.0	.28
298	7/08/80	Oba	7.5	<.01	.03	254	<.003	62.4	4.0	<.01	328	<.10	240	.20	<.05	.02	21	<.01	.01	.004	1.50	1.14	.77	40	12	1.35
301	6/18/80	Obh	7.3	<.01	.08	142	<.003	24.8	1.0	<.01	196	.28	90	.04	<.05	.01	24.8	<.01	.03	.002	.16	<10	24.3	20	1.0	.01
303	6/18/80	Obh	7.1	<.01	.06	156	<.003	22.9	1.0	<.01	232	.35	94	.72	<.05	.18	22.9	<.01	.18	.002	.02	<10	31.5	20	<1.0	.01
308	6/19/80	Ock	6.2	<.01	.04	36	<.003	17	44	.02	230	<.10	84	.28	<.05	.09	9.6	.02	.01	.012	4.39	<10	<10	45	1.0	.07
309	7/02/80	Ock	7.7	.017	.08	108	<.003	17.6	2.0	.04	144	.14	60	.04	<.05	.03	4.5	<.01	.05	.006	.02	1.14	22.7	15	3.0	.07
313	7/02/80	Ock	6.2	<.01	.05	22	<.003	6.1	2.0	.02	66	.10	<20	.30	<.05	.01	2.9	<.01	.01	.002	.02	1.10	1.87	20	1.0	.11
322	7/02/80	Obh	7.4	<.01	.04	132	<.003	25.3	7.0	<.01	174	.20	84	.37	<.05	.11	7.5	<.01	.19	.002	.02	0.7	27.4	20	3.0	.04
361	7/09/80	Ocl	7.6	<.01	.02	144	<.003	56	5.0	<.01	182	<.10	145	.04	<.05	.01	1.5	.01	.01	.004	2.64	1.02	2.86	20	4.0	.12
362	7/09/80	Єg	7.6	<.01	.03	218	<.003	50.4	5.0	.01	254	<.10	205	.17	<.05	.01	20	.01	.01	.004	1.46	1.12	1.65	20	3.0	.01
CENTRE COUNTY																										
Ce-238	7/16/80	Osl	7.7	<.01	.01	122	<.003	33.3	3.0	<.01	226	<.10	125	.01	<.05	<.01	9.6	---	.02	.002	3.96	---	.66	10	50	.01
240	7/16/80	Osl	7.8	<.01	.01	200	<.003	52.1	8.0	<.01	342	<.10	202	.22	<.05	<.01	20.5	---	.01	.002	5.06	---	.99	20	26	.03
FULTON COUNTY																										
Fu-131	9/16/80	Mp	6.1	<.01	.04	24	<.003	0.7	<1.0	.03	16	<.10	<20	6.05	<.05	1.12	2.2	.04	.01	.002	.02	.46	.88	5	---	.08
133	9/16/80	Mp	6.9	<.01	.05	94	<.003	17.8	1.0	.05	104	.23	45	2.4	<.05	.33	2.7	.01	.10	.002	.04	1.08	16.3	5	---	.01
134	9/16/80	Mp	6.1	<.01	.06	20	<.003	2.9	5.0	.01	42	<.10	<20	5.29	<.05	.87	2.3	<.01	.01	.002	.02	.64	4.07	5	---	.14
140	9/17/80	Mmc	6.9	<.01	.02	102	<.003	30.2	18	.01	98	<.10	82	1.39	<.05	.22	3.8	.02	.10	.002	.02	3.14	1.26	5	---	<.01
170	9/18/80	Os	6.5	<.01	.04	62	<.003	4.2	2.0	.01	88	.18	40	1.43	<.05	.49	7.5	<.01	.07	.002	.06	.74	6.93	5	---	.01
Sp-3	9/18/80	Ooo	5.9	<.01	.06	10	<.003	3.6	<1.0	.01	14	<.10	<20	.02	<.05	<.01	1.0	<.01	.01	.004	.50	.96	.88	10	---	.01

TABLE 15. (CONTINUED)

Well number	Date of collection	Aquifer[1]	pH	Arsenic (As)	Aluminum (Al)	Alkalinity ($CaCO_3$)	Cadmium (Cd)	Calcium (Ca)	Chloride (Cl)	Chromium (Cr)	Dissolved solids	Fluoride (F)	Hardness ($CaCO_3$)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Magnesium (Mg)	Nickel (Ni)	NH_3, as N	NO_2, as N	NO_3, as N	Potassium (K)	Sodium (Na)	Sulfate (SO_4)	Total organic carbon	Zinc (Zn)
HUNTINGDON COUNTY																										
Hu-116	5/13/80	Oh	6.8	<.01	.03	110	<.003	26.9	4.0	<.01	186	.10	111	3.66	<.05	.11	7.7	<.01	.11	.002	.19	<10	<10	10	<1.0	<.01
117	5/13/80	Oh	6.2	<.01	.03	54	<.003	12.9	8.0	<.01	146	<.10	69	.93	<.05	.13	7.7	.02	.01	.048	.02	<10	<10	10	<1.0	.03
119	6/05/80	Ons	7.4	<.01	.05	184	<.003	34.8	2.0	<.01	204	<.10	170	.11	<.05	.01	20.1	.02	.01	.002	1.6	<10	<10	20	4.0	.10
130	7/09/80	Sbm	7.4	<.01	.01	232	<.003	81.6	17	.01	326	.14	440	.10	<.05	.01	59.0	.01	.11	.002	.58	2.5	3.74	45	1.0	.01
135	7/15/80	Obh	7.5	<.01	.10	138	<.003	25.8	3.0	---	200	.18	108	.04	<.05	.02	11.4	---	.02	.002	.02	---	13.6	20	5.0	.48
138	7/15/80	Mmc	7.6	<.01	.08	104	<.003	29.9	2.0	<.01	162	.12	83	<.01	<.05	.01	2.4	<.01	.02	.002	2.0	---	6.82	10	3.0	.02
142	7/15/80	Ock	6.5	<.01	.08	54	.004	3.6	2.0	<.01	96	<.10	40	.07	<.05	.03	7.1	<.01	.02	.002	1.74	---	4.62	10	4.0	9.81
144	7/16/80	Obh	7.4	<.01	2.21	98	.004	13.7	1.0	<.01	180	.20	64	.09	<.05	.13	7.7	---	.25	.002	.02	---	17.8	20	<1.0	.05
146	7/16/80	Ock	4.7	<.01	2.21	6	.004	26.4	4.0	<.01	264	.20	132	.06	<.05	1.11	10.9	---	.01	.002	.26	---	2.86	125	4.0	.38
147	7/16/80	Mmc	7.1	<.01	.04	80	.004	28.7	3.0	<.01	156	<.10	88	.59	<.05	.04	5.6	---	.01	.002	.52	---	2.31	25	9.0	.01
148	7/29/80	Swc	7.2	<.01	.03	264	<.003	58.8	3.0	<.01	282	.13	270	.39	<.05	.04	12.3	<.01	.09	<.002	.32	5.22	.66	20	5.0	.01
149	7/31/80	Of	7.6	<.01	.05	194	<.003	26.7	1.0	.01	246	<.10	172	.58	<.05	.11	24.1	.02	<.01	<.002	<.02	1.3	8.47	10	8.0	3.92
151	7/09/80	Obh	7.4	<.01	.03	94	<.003	19.2	2.0	<.01	114	.19	76	.06	<.05	.10	7.0	<.01	.01	.002	.02	.54	7.81	25	3.0	.01
153	7/09/80	Obh	7.4	<.01	.04	100	<.003	19.2	2.0	<.01	102	.16	81	.04	<.05	.09	8.5	<.01	.01	.002	.02	0.6	9.24	25	4.0	<.01
155	7/09/80	Obh	7.8	<.01	.02	100	<.003	24.8	3.0	.01	80	.15	90	<.01	<.05	.05	7.0	<.01	.11	.002	.02	.34	7.92	25	6.0	<.01
160	7/10/80	Oh	7.2	<.01	.03	122	<.003	35.2	2.0	<.01	238	.14	125	.12	<.05	.18	9.5	<.01	.20	.002	.18	.68	16.1	65	10	.03
162	7/10/80	Ooo	7.5	<.01	.04	132	<.003	63.2	3.0	<.01	246	.21	155	.18	<.05	.01	<.50	<.01	.01	.002	.96	1.66	1.21	50	7.0	.02
173	7/15/80	Obh	7.3	<.01	.05	118	<.003	19.6	2.0	<.01	174	.22	91	.02	<.05	.22	10.1	---	.01	.008	.02	---	8.69	15	10	.01
188	7/09/80	Oh	7.6	<.01	.02	86	<.003	20.8	2.0	<.01	94	.26	68	.04	<.05	.04	4.0	<.01	.23	.006	.06	.38	9.9	20	7.0	<.01
191	7/09/80	Ooo	5.7	<.01	.03	10	<.003	5.6	7.0	.01	236	<.10	40	.14	<.05	.02	6.5	<.01	.01	.002	1.76	1.14	2.64	25	3.0	.03
200	7/15/80	Osl	7.8	<.01	.04	180	<.003	40.7	8.0	<.01	248	<.10	176	.01	<.05	<.01	22.7	---	.02	.002	7.56	---	4.51	10	25	.45
208	7/16/80	Mmc	7.6	<.01	.04	172	<.003	60.8	3.0	<.01	272	.24	145	.03	<.05	<.01	5.5	---	.02	.002	1.98	---	6.71	20	24	.03
224	7/23/80	Oh	7.3	<.01	<.01	256	<.003	98	1.0	.01	---	.11	247	1.62	<.05	.07	8.4	.02	.09	.002	.02	1.26	2.64	20	<1.0	.01
229	7/29/80	Ock	7.5	<.01	.05	100	<.003	16.9	.40	.04	130	<.10	72	.06	<.05	.01	7.0	.01	<.01	<.002	.02	1.12	8.8	10	4.0	.01
230	7/31/80	Mmc	6.7	<.01	.05	62	<.003	25.8	3.0	<.01	226	<.10	98	.33	<.05	.02	6.4	.02	<.01	<.002	.68	.70	7.48	50	<1.0	.13
234	7/29/80	Oh	6.8	<.01	.05	60	<.003	12.4	1.0	.01	104	.14	58	.57	<.05	.12	3.9	.02	.01	.004	.02	.62	5.72	10	1.0	.02
236	7/29/80	Os	7.3	<.01	.03	120	<.003	22.2	.40	.02	148	.12	90	.62	<.05	.17	7.3	<.01	.11	<.002	<.02	.62	8.03	5	9.0	<.01
263	7/16/80	Ocl	7.8	<.01	.07	260	<.003	36.4	16	<.01	406	1.5	170	.19	<.05	.01	21.7	---	1.68	.002	.01	---	29.5	30	8.0	.01
266	7/17/80	Ooo	7.7	<.01	.03	202	<.003	71	2.0	.02	302	.13	170	.03	<.05	<.01	12.4	---	.01	.002	1.10	---	1.1	20	14	.01
277	7/30/80	OSkt	7.5	<.01	.05	216	<.003	58.3	4.0	.01	360	.16	284	.05	<.05	<.01	20.8	.01	<.01	<.002	1.0	.68	.88	35	6.0	.01
278	7/30/80	Oh	7.4	<.01	.04	104	<.003	38.1	1.0	.04	272	<.10	140	.03	<.05	.01	10.6	---	.01	<.002	.14	.82	7.92	60	1.0	.01
282	7/30/80	Olh	6.6	<.01	.03	70	<.003	14	12	.01	184	.11	70	4.59	<.05	.32	6.3	<.01	.01	<.002	.82	.90	8.47	5	---	.01
288	7/31/80	Oh	6.5	<.01	.05	38	<.003	5.3	1.0	.01	140	.11	40	.25	<.05	.05	5.4	<.01	<.01	<.002	<.02	1.0	7.59	20	<1.0	.16
290	7/31/80	Oh	6.9	<.01	.05	50	<.003	11.8	0.8	.01	76	<.10	40	.07	<.05	<.01	2.2	<.01	<.01	<.002	.08	.46	4.84	5	1.0	.01
300	7/22/80	Ooo	7.4	<.01	.02	180	<.003	50.7	1.0	<.01	---	.95	172	.02	<.05	<.01	17	<.01	<.01	<.002	.42	.74	.38	20	9.0	.75
303	7/23/80	Swc	7.4	<.01	<.01	98	<.003	25.3	1.0	.01	---	.12	88	.01	<.05	<.01	9.9	<.01	<.01	<.002	2.42	.48	2.09	5	<1.0	.01
306	7/23/80	Swc	7.1	<.01	<.01	246	<.003	418	2.0	.03	---	.32	364	.86	<.05	.03	78	.03	.30	<.002	<.02	3.06	11	1210	<1.0	.01
310	7/24/80	OSkt	7.6	<.01	<.01	226	<.003	50.6	2.0	<.01	---	.11	224	.01	<.05	<.01	30.9	<.01	.01	.004	.34	1.16	.48	20	<1.0	.02
313	7/24/80	Sbm	7.3	<.01	<.01	156	<.003	55.5	2.0	.01	---	.13	148	.08	<.05	.03	9.4	<.01	.17	<.002	<.02	1.46	4.29	20	5.0	<.01
318	7/29/80	Oh	7.4	<.01	.04	212	<.003	57.9	1.0	.02	298	.16	215	1.46	<.05	.08	18.4	<.01	.17	<.002	<.02	.82	9.9	50	12	<.01

Hu-320	7/30/80	Swc	7.8	<.01	.06	266	<.003	36.4	1.0	.02	360	.46	160	.01	<.05	.01	16.2	<.01	.24	.008	<.02	3.54	64.4	55	46	.02
324	7/30/80	Sbm	7.3	<.01	.07	232	<.003	83.2	3.0	.02	342	.10	246	.02	<.05	<.01	6.4	<.01	<.01	<.002	1.76	1.0	.99	25	12	.01
327	7/31/80	Ock	8.7	.085	.09	142	<.003	6.6	2.0	<.01	176	.40	<20	.03	<.05	.03	1.8	<.01	.10	.002	.02	.34	56.7	32	---	<.01
332	8/01/80	Oh	7.7	<.01	.08	98	<.003	20.4	1.0	<.01	130	.13	64	.14	<.05	.05	4.7	<.01	.19	.002	.02	.62	11.9	17	---	<.01

JUNIATA COUNTY

Ju-310	5/15/80	Oh	7.1	<.01	.01	100	<.003	42.8	29	<.01	272	<.10	157	<.01	<.05	.01	5.8	<.01	.01	.002	.86	<10	<10	15	<1.0	.01
331	5/15/80	Sbm	7.0	<.01	<.01	234	<.003	99.2	6.0	<.01	404	.14	256	.04	<.05	<.01	15	<.01	.01	.002	10.1	<10	<10	35	<1.0	.02
339	5/20/80	Swc	7.5	<.01	.03	110	<.003	33.3	6.0	.01	222	<.10	135	.05	<.05	<.01	10.9	<.01	.30	.002	3.96	<10	<10	15	1.0	.01
340	5/29/80	Sc	7.6	<.01	.05	140	<.003	31.8	1.0	.05	188	.12	138	.04	<.05	.06	15.3	.01	.01	.004	.20	<10	<10	20	8.0	.01
355	5/29/80	Oh	7.0	<.01	.07	44	<.003	11	1.0	.01	76	<.10	43	.28	<.05	<.01	2.3	.01	.01	.002	.04	<10	<10	20	<1.0	.01

MIFFLIN COUNTY

Mf-236	7/16/80	Oh	7.7	<.01	.03	152	<.003	38.8	5.0	<.01	236	.15	151	.04	<.05	.01	15.4	---	.18	.002	.02	---	<10	35	8.0	.04
241	7/23/80	Obf	7.6	<.01	<.01	196	<.003	58	20	<.01	---	<.10	232	.02	<.05	<.01	28.3	<.01	.02	.004	.66	1.14	6.38	20	<1.0	.01
245	7/24/80	Ooo	6.9	<.01	.14	80	<.003	32.3	<1.0	<.01	---	<.10	66	.04	<.05	<.01	1.3	<.01	.01	<.002	<.02	.46	1.10	5	<1.0	.02
246	7/24/80	Oh	7.2	<.01	<.01	98	<.003	29.8	1.0	.01	---	.13	88	.20	<.05	.09	6.2	<.01	.07	<.002	<.02	.42	6.27	20	<1.0	.08
251	5/22/80	Ooo	7.2	<.01	<.01	188	<.003	60.4	12	.07	292	.19	200	.12	<.05	.03	13.2	.01	.01	.014	1.9	.42	6.27	20	3.0	.01
254	5/22/80	Ooo	7.5	<.01	<.01	152	<.003	57.7	6.0	.01	316	.10	166	.05	<.05	<.01	4.7	<.01	.01	.002	1.9	<10	<10	15	2.0	.01
261	5/28/80	Oh	7.3	<.01	.19	114	<.003	35.1	5.0	<.01	172	.16	110	.35	<.05	.12	4.7	.01	.17	.002	.02	<10	<10	15	<1.0	<.01
262	5/28/80	Oh	7.3	<.01	.27	168	<.003	46.3	1.0	<.01	268	.15	175	4.03	<.05	.32	13.3	<.01	.20	.004	.02	<10	17.8	60	2.0	.38
263	5/28/80	Or	7.5	<.01	.03	92	<.003	18.6	1.0	<.01	130	.18	70	.11	<.05	.05	6.3	.02	.44	.004	.06	<10	<10	<5	<1.0	<.01
275	7/30/80	Obf	7.3	<.01	.05	346	<.003	75.8	24	.11	536	.52	440	.03	<.05	.02	34.7	<.01	.01	<.002	8.36	2.06	7.48	30	14	.03
277	5/20/80	Swc	7.7	<.01	.03	158	<.003	33.5	4.0	.04	196	<.10	155	.02	<.05	<.01	16.1	<.01	.34	.004	1.92	<10	<10	10	2.0	.02
278	5/22/80	OSkt	7.5	<.01	.11	154	<.003	50.8	2.0	.04	154	<.10	155	.07	<.05	.01	6.1	<.01	.01	.008	.56	.70	.66	15	<1.0	.06
283	5/28/80	OSkt	7.2	<.01	.03	188	<.003	76.6	4.0	<.01	226	.12	195	.09	<.05	<.01	1.8	.02	.01	.002	.30	<10	<10	10	<1.0	.01
291	5/28/80	Oh	5.9	<.01	.03	22	<.003	9.6	23	<.01	124	<.10	58	2.99	<.05	.21	3.3	.01	.10	.006	3.29	<10	<10	5	<1.0	.02
297	8/07/80	Swc	7.5	<.01	.07	280	<.003	79.2	2.0	<.01	442	.11	268	.24	<.05	.20	24.8	.01	.18	.020	.36	1.44	5.94	49	---	.04
300	8/06/80	Or	7.6	<.01	.06	258	<.003	109	29	.01	474	.11	300	.38	<.05	.03	7.1	<.01	.01	.002	.02	1.10	12.6	66	---	.01
301	8/06/80	Sc	8.1	<.01	.10	138	<.003	21.6	7.0	.01	174	.28	84	1.27	<.05	.08	5.8	<.01	.29	.004	.02	2.08	24.8	3	---	.02
302	8/06/80	OSkt	7.7	<.01	.08	186	<.003	59.6	8.0	.01	340	.12	200	.11	<.05	.01	17.9	<.01	.01	.004	.02	1.06	1.32	24	---	.04
303	8/06/80	Sc	8.0	<.01	.05	126	<.003	19.9	5.0	.01	186	.17	76	.15	<.05	.10	4.3	<.01	.21	.006	.02	1.04	28.5	15	---	.01
309	8/07/80	OSkt	7.9	<.01	.07	144	<.003	41.7	2.0	<.01	172	<.10	132	.10	<.05	.01	7.8	<.01	.05	.002	.06	.94	.44	3	---	.02

PERRY COUNTY

Pe-559	5/07/80	Ock	7.4	<.01	.02	108	<.003	20.5	10	<.01	150	.18	92	.03	<.05	.25	11.8	<.01	.03	.002	.21	<10	<10	35	<1.0	.03
560	5/07/80	Ock	7.1	<.01	.02	112	<.003	18.5	3.0	<.01	132	.33	85	.36	<.05	.66	9.7	<.01	.03	.008	.02	<10	10.3	10	2.0	.07
565	5/08/80	Swc	7.7	<.01	.03	172	<.003	42.5	6.0	<.01	250	.18	196	.01	<.05	<.01	17.6	<.01	.01	.008	3.29	<10	<10	35	1.0	.01
567	5/08/80	Otr	6.5	<.01	.02	56	<.003	6.2	6.0	<.01	60	.24	40	1.55	<.05	.72	4.5	<.01	.02	.002	.02	<10	<10	10	<1.0	.02
569	5/13/80	Ock	6.7	<.01	.07	60	<.003	11.5	1.0	.01	86	.11	50	.08	<.05	<.01	5.0	<.01	.02	.006	.16	<10	<10	<5	<1.0	.02
570	5/13/80	Ock	6.8	<.01	.02	124	<.003	21.2	2.0	<.01	98	.16	106	.77	<.05	.37	9.1	<.01	.02	<.002	.02	<10	<10	<5	<1.0	.01
627	5/14/80	Ock	6.9	<.01	<.01	68	<.003	11.3	2.0	.03	130	.19	60	.86	<.05	.42	5.6	.01	.05	<.002	.02	<10	<10	10	<1.0	.01
630	5/14/80	Ooo	7.2	<.01	.01	222	<.003	60.4	6.0	<.01	137	.18	222	1.14	<.05	.08	12.7	<.01	.02	<.002	.20	<10	<10	10	2.0	<.01
636	5/20/80	Ock	9.2	<.01	.01	148	<.003	0.1	4.0	.01	198	.26	<20	.03	<.05	.01	5.43	.01	.33	.004	.04	<10	61.4	10	1.0	<.01
641	5/28/80	Ock	7.1	<.01	.04	126	<.003	34	14.0	<.01	152	.18	118	.26	<.05	.23	8.5	.02	.08	.002	.02	<10	<10	<5	<1.0	<.01
647	5/20/80	Otr	6.9	<.01	.03	82	<.003	17.9	8.0	.05	146	.22	76	.05	<.05	.02	8.4	<.01	.35	.002	1.26	<10	<10	40	4.0	.01

[1]Pc, Conemaugh Group; Mmc, Mauch Chunk Formation; Mp, Pocono Formation; Ock, Catskill Formation; Of, Foreknobs Formation; Os, Scherr Formation; Olh, Lock Haven Formation; Otr, Trimmers Rock Formation; Obh, Brallier and Harrell Formations, undivided; Oh, Hamilton Group; Ooo, Onondaga and Old Port Formations, undivided; OSkt, Keyser and Tonoloway Formations, undivided; Swc, Wills Creek Formation; Sbm, Bloomsburg and Mifflintown Formations, undivided; Sc, Clinton Group; Or, Reedsville Formation; Ocl, Coburn Formation through Loysburg Formation, undivided; Obf, Bellefonte Formation; Oba, Bellefonte and Axemann Formations, undivided; Ons, Nittany and Stonehenge/Larke Formations, undivided; Osl, Stonehenge/Larke Formation; Єg, Gatesburg Formation; Єw, Warrior Formation.

TABLE 16. RECORD OF WELLS

Well location: The number that is assigned to identify the well. It is prefixed by a two-letter abbreviation of the county. The latitude and longitude (lat-long) are the coordinates in degrees and minutes of the southeast corner of a 1-minute quadrangle within which the well is located.

Use: A, air conditioning; C, commercial; D, dewatering; H, household; I, irrigation; N, industrial; P, public; R, recreation; S, stock; T, institutional; U, unused; Z, other.

Topographic setting: F, flat; H, hilltop; S, hillside; T, terrace; U, undulating; V, valley; W, draw.

Aquifer: Pc, Conemaugh Group; Pa, Allegheny Group; Pp, Pottsville Group; Mmc, Mauch Chunk Formation; Mp, Pocono Formation; MOr, Rockwell Formation; Dck, Catskill Formation; Dcsc, Sherman Creek Member of Catskill Formation; Dciv, Irish Valley Member of Catskill Formation; Df, Foreknobs Formation; Ds, Scherr Formation; Dlh, Lock Haven Formation; Dtr, Trimmers Rock Formation; Dbh, Brallier and Harrell Formations, undivided; Dha, Harrell Formation; Dhb, Burket Member of Harrell Formation; Dh, Hamilton Group; Dmh, Mahantango Formation; Dmsr, Sherman Ridge Member of Mahantango Formation; Dmo, Montebello Member of Mahantango Formation; Dm, Marcellus Formation; Doo, Onondaga and Old Port Formations, undivided; Don, Onondaga Formation; Dop, Old Port Formation; DSkm, Keyser Formation through Mifflintown Formation, undivided; DSkt, Keyser and Tonoloway Formations, undivided; DSk, Keyser Formation; Sto, Tonoloway Formation; Swc, Wills Creek Formation; Sbm, Bloomsburg and Mifflintown Formations, undivided; Sb, Bloomsburg Formation; Sm, Mifflintown Formation; Sc, Clinton Group; St, Tuscarora Formation; Oj, Juniata Formation; Obe, Bald Eagle Formation; Or, Reedsville Formation; Ocl, Coburn Formation through Loysburg Formation, undivided; Ocn, Coburn Formation through Nealmont Formation, undivided; Obl, Benner Formation through Loysburg Formation, undivided; Ob, Beekmantown Group; Oba, Bellefonte and Axemann Formations, undivided; Obf, Bellefonte Formation; Oa, Axemann Formation; Ons, Nittany and Stonehenge/Larke Formations, undivided; On, Nittany Formation; Osl, Stonehenge/Larke Formation; Cg, Gatesburg Formation; Cgm, Mines Member of Gatesburg Formation; Cw, Warrior Formation; Cph, Pleasant Hill Formation; Cwb, Waynesboro Formation.

Lithology: cash, calcareous shale; dol, dolomite; ls, limestone; sh, shale; ss, sandstone.

Static water level: Depth--F, flows but head is not known. Date--month/last two digits of year.

Reported yield: gal/min, gallons per minute.

Specific capacity: (gal/min)/ft, gallons per minute per foot of drawdown.

Specific conductance: Micromhos at 25 degrees Celsius (°C).

TABLE 16.

Well location: Number	Well location: Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/lithology
								BEDFORD
Bd- 5	4000-7822	Everett Bor. Water Co.	Herr	---	U	1060	V	DSkt/ls
14	3958-7821	Frank O'Neil	---	---	H	1022	S	Df/sh
15	3958-7819	W. C. Slonacher	---	---	H	1280	H	Df/sh
19	4000-7817	George Gibney	---	---	H	1180	S	Dck/ss
60	4009-7815	W. Carberry	Hess	---	D	900	S	Mmc/sh
65	4007-7819	Yellow Creek Ice Plant	---	---	N	950	V	Sb/sh
97	4001-7840	Leon Falk	D. M. Hall	---	H	1380	S	Dop/ss
106	4001-7831	Bedford Bor.	George Walters	---	P	1250	S	Sc/sh
107	4001-7830	Suplee-Wills-Jones Milk Co.	---	---	N	1070	V	Swc/ls
108	4001-7830	McLaughlin Handle Factory	---	---	U	1090	S	Swc/ls
118	4002-7845	Herbert Paulsen	---	---	H	2440	S	Mp/ss
150	4002-7828	T. Burnett	Gerald W. Clark	1965	Z	1140	S	Don/---
151	4002-7828	Weaver	do.	---	H	1160	S	Dop/---
152	4002-7827	Fetter	do.	---	---	1220	S	Dop/---
153	3959-7814	Breezewood Methodist Ch.	do.	---	---	1340	S	Dck/---
154	4002-7828	T. Burtnett	do.	---	---	1120	V	Dop/ss
155	4017-7833	Blue Knob State Park	H. A. Stormer & Son	---	---	3120	H	Mp/---
156	4002-7828	Burtnett	---	1967	---	1120	V	Dh/---
167	4004-7842	Leroy Grine	---	1963	H	1550	S	Dck/---
168	4002-7837	Pa. Dept. of Environmental Resources	---	---	P	1210	S	Dck/---
169	4001-7833	Shawnee State Park	---	---	H	1180	V	Dmh/---
170	4001-7841	Norah Hilligas	---	---	H	1260	V	Dmh/---
171	4001-7841	Roy Hillegas	---	1955	H	1280	V	Dmh/---
172	4002-7838	Pa. Dept. of Environmental Resources	Thomas Coyle	---	P	1170	S	Dm/---
173	4001-7848	Shawnee State Park	do.	1954	---	1160	V	Dmh/---
174	4001-7838	do.	do.	---	R	1260	S	Dmh/---
175	4002-7837	do.	do	---	---	1180	V	Df/---
176	4002-7837	do.	do.	1954	R	1180	V	Df/---
177	4001-7838	do.	do.	---	R	1100	V	Dmh/---
183	3955-7835	Texas Eastern Transmission Corp.	Layne-New York Co., Inc.	1952	P	1370	V	DSkt/---
187	4016-7835	Blue Knob State Park	S. G. Spicher	1939	H	1901	S	Dck/---
188	4016-7835	do.	H. A. Stormer & Son	1940	R	1901	S	Dck/---
193	4001-7829	Kennametal Inc.	Harrisburg's Kohl Bros.	1951	N	1080	V	Dop/---
194	4001-7829	do.	do.	1951	N	1080	V	Dop/---
195	4001-7829	Humble Oil & Refining Co.	do.	1947	U	1200	S	Doo/---
196	4001-7829	do.	do.	1947	C	1200	S	Doo/---
197	4001-7829	do.	do.	1947	C	1200	S	Doo/---
198	4001-7829	do.	do.	1953	C	1200	S	Doo/---
199	3959-7814	do.	---	---	C	1310	S	Dck/ss
200	3959-7814	do.	Harrisburg's Kohl Bros.	1956	C	1310	S	Dck/ss
201	3959-7814	do.	do.	1962	C	1310	S	Dck/ss
202	3959-7814	do.	do.	1964	C	1310	S	Dck/ss
203	4010-7822	Waterside-Loysburg	Harold E. Ritchey	---	P	---	S	Dr/---
204	4010-7831	Osterburg Water Co.	---	---	P	1138	V	Dop/---
206	4003-7821	Everett Munic. Authority	Harrisburg's Kohl Bros.	1966	P	1100	V	DSkt/---
211	4010-7833	D. G. Miller	Gerald W. Clark	1980	H	1150	V	Dh/---
212	4008-7832	C. Wise	Jeff C. Pyle	1979	H	1240	S	Dh/---
213	4008-7832	O. Stiffler	Milford Frazier	1979	H	1260	S	Dbh/---
214	4008-7831	O. Knisely	Gerald W. Clark	1980	H	1175	V	Dbh/sh
215	4009-7834	R. Rager	Milford Frazier	1978	H	1185	H	Dh/---
216	4009-7834	R. Tiffany	do.	1978	H	1190	H	Dh/---
217	4008-7834	Chestnut Ridge Sch. Dist.	Gerald W. Clark	1980	T	1160	S	Doo/ls
218	4007-7834	Chestnut Ridge Ind. Fellowship Ch.	do.	1980	T	1150	S	Dh/sh
219	4009-7831	St. Clairsville Lutheran Parish	do.	1979	H	1155	F	Dh/sh
220	4009-7832	B. Earnst	Jeff C. Pyle	1979	H	1170	V	Dh/---
221	4009-7834	R. Phelps	Gerald W. Clark	1979	H	1180	H	Dh/sh
222	4007-7834	R. Evans	Milford Frazier	1980	H	1290	S	Dbh/---
223	4011-7835	E. Oldham	Gerald W. Clark	1978	H	1220	V	Dbh/sh
224	4012-7831	R. Christ	do.	1978	H	1215	S	Dh/sh
225	4012-7832	H. Claycomb	do.	1979	H	1315	S	Dbh/sh
226	4001-7821	F. R. Mearkle	do.	1978	H	1060	V	Dbh/sh
227	4001-7820	R. Crawford	do.	1980	H	1420	H	Df/sh
228	4001-7820	K. Grace	do.	1978	H	1320	S	Df/sh
229	4001-7819	Randy Baughman	do.	1979	H	1300	H	Df/---
230	4001-7819	J. W. Swope	do.	1979	H	1080	S	Df/sh
231	4001-7819	R. Henry	do.	1980	H	1180	V	Dck/sh
232	4001-7819	Jerry Lewis	do.	1979	H	1190	S	Df/sh
233	4001-7819	D. Woy	do.	1979	H	1300	H	Dck/sh
234	4000-7815	Derl Beck	do.	1978	H	1260	F	Dck/---
235	4000-7815	E. Cloude	do.	1978	H	1140	V	Dck/---
236	4001-7815	D. R. Hess	do.	1980	H	1280	S	Dck/---
237	4001-7815	T. Reyan	do.	1978	H	1360	S	Ds/sh
238	4002-7816	E. Laidig	do.	1978	H	1120	S	Dck/---
239	4002-7816	B. Winck	do.	1978	H	1360	H	Df/sh
240	4001-7819	C. Feight	do.	1978	H	1060	F	Dck/sh
241	4003-7821	R. Greenawalt	do.	1979	H	1100	V	DSkt/ls

RECORD OF WELLS

Total depth below land surface (feet)	Casing Depth (feet)	Casing Diameter (inches)	Depth(s) to water-bearing zone(s) (feet)	Static water level Depth below land surface (feet)	Static water level Date measured (mo/yr)	Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
COUNTY											
500	18	6	---	1	---	30	.12	---	---	---	8d- 5
60	20	6	---	10	---	4	---	---	---	---	14
110	20	6	---	40	---	1	---	---	---	---	15
192	20	6	---	92	---	9	---	---	---	---	19
90	50	6	---	50	---	5	---	---	---	---	60
34	27	6	---	8	---	10	---	---	---	---	65
194	15	6	---	100	---	25	---	---	---	---	97
240	---	8	---	---	---	5	---	---	---	---	106
180	40	8	---	22	---	60	---	---	---	---	107
100	20	6	---	14	---	8	---	---	---	---	108
400	40	8	---	365	---	35	---	---	---	---	118
150	47	6	58;88	28	---	---	---	---	---	---	150
130	130	---	---	---	---	---	---	---	---	---	151
155	155	6	---	---	---	---	---	---	---	---	152
298	---	6	---	93	---	---	---	---	---	---	153
183	185	6	---	31	4/68	6	.17	5	270	---	154
500	103	---	---	298	---	---	---	---	---	---	155
418	---	---	---	33	---	---	---	---	---	---	156
12	---	---	---	2	---	---	---	---	---	---	167
---	---	---	---	---	---	---	---	---	---	---	168
140	---	6	---	---	---	---	---	---	---	---	169
10	---	---	---	---	---	---	---	---	---	---	170
107	---	6	---	---	---	3	---	---	---	---	171
48	20	---	---	---	---	10	---	---	540	7.3	172
50	18	6	---	4	---	4	.09	---	335	---	173
120	21	6	---	---	---	---	---	---	257	---	174
207	---	6	---	---	---	15	---	---	443	---	175
76	21	6	---	20	---	5	---	---	304	---	176
150	---	6	---	---	---	2	---	---	---	---	177
95	---	12	---	18	---	32	2.8	---	---	---	183
200	100	6	115;170	70	10/40	34	3.4	---	---	---	187
115	52	6	59;68;81;110	48	10/40	20	.4	---	---	---	188
236	28	8	---	23	10/51	200	1.5	---	---	---	193
219	42	6	---	21	10/51	200	2.2	---	---	---	194
267	---	---	---	---	---	0	.01	---	---	---	195
335	255	6	---	90	6/47	35	.35	---	---	---	196
220	102	6	---	75	6/47	45	.6	---	---	---	197
680	---	6	---	235	---	72	.69	---	---	---	198
140	---	6	---	---	---	10	---	---	---	---	199
176	26	6	---	58	6/56	20	.43	---	---	---	200
200	28	6	---	---	---	12	---	---	---	---	201
457	42	6	---	184	---	15	---	---	---	---	202
300	40	6	---	---	---	42	.56	6	---	8.0	203
235	150	6	---	---	---	17	---	---	---	---	204
500	66	8	90;290	6	11/66	84	.81	---	---	---	206
244	20	6	15;130;160	4	8/80	1	.01	---	---	---	211
300	25	---	170	48	8/80	2	---	6	260	---	212
67	27	6	23;35	---	4/79	2	---	---	---	---	213
138	20	6	30	8	8/80	5	.04	9	240	---	214
73	38	6	60	48	8/80	10	---	11	360	---	215
55	22	6	48	---	4/78	20	---	---	---	---	216
223	50	6	15;110;208;210	F	5/80	150	1.5	---	---	---	217
460	20	6	18;160;240	F	8/80	1	.01	---	---	---	218
200	20	6	40;165	12	8/80	---	---	10	275	---	219
245	20	---	220	31	8/80	3	---	3	380	---	220
100	30	6	50;70;75	47	8/80	25	.6	13	420	---	221
50	12	6	25;35	---	5/80	20	---	---	---	---	222
223	21	6	80	80	12/78	1	.01	---	---	---	223
182	22	6	96;141;153	10	6/78	16	.11	---	---	---	224
620	34	6	400	300	4/79	1	.01	---	---	---	225
83	22	6	40;57;67	3	8/80	17	.20	---	---	---	226
183	52	6	61;90;158	80	5/80	25	.30	---	---	---	227
303	20	6	151;221	80	7/78	3	.01	---	---	---	228
274	---	6	270	160	5/79	20	.20	---	---	---	229
82	30	6	39;60;66	26	8/80	15	.36	5	165	---	230
253	30	6	165;185;225	100	4/80	10	.08	---	---	---	231
143	28	6	70;114	70	6/79	8	.15	6	255	---	232
203	73	6	133;163;174	100	4/79	20	.20	---	---	---	233
405	32	6	200;380	200	1/78	4	.03	---	---	---	234
420	22	6	240	150	8/78	2	.01	3	140	---	235
346	52	6	140;203;305	174	8/80	4	.02	5	200	---	236
102	34	6	50;76;95	40	8/78	25	.60	---	---	---	237
223	21	6	120;138;160;203	100	10/78	12	.20	3	120	---	238
122	42	6	85;98	30	6/78	8	.11	---	---	---	239
103	30	6	53;67;78	32	7/78	11	.15	---	---	---	240
63	20	6	13;33	20	2/79	20	2.0	---	---	---	241

TABLE 16.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/lithology
Number	Lat-Long							
Bd-242	4005-7820	J. Norris	Gerald W. Clark	1979	H	1020	V	Swc/ls
243	4004-7820	I. McKinney	do.	1977	H	1220	S	Dh/sh
244	4004-7820	Charles Croyle	do.	1977	H	1260	S	Doo/sh
245	4003-7821	G. Blackstone	do.	1979	H	1180	S	Doo/---
246	4005-7820	D. Ritchey	do.	1978	T	1080	V	Swc/ls
247	4005-7820	G. Brown	do.	1979	H	1090	V	Swc/ls
248	4007-7818	B. Zellers	do.	1978	H	940	S	Dh/ls
249	3939-7821	J. Stewart	do.	1979	H	1380	S	Df/sh
250	3939-7821	T. Layman	do.	1979	H	1305	S	Df/---
251	4004-7830	M. Walper	do.	1978	H	1200	S	Swc/---
252	4003-7832	C. Zimmerman	do.	1979	---	1295	S	DSkt/---
253	4003-7832	do.	do.	1979	H	1291	S	DSkt/---
254	4003-7832	Feathers	do.	1977	H	1245	S	Swc/---
255	4002-7831	P. Beamer	do.	1979	H	1204	S	Sc/---
256	4002-7831	V. Shaw	do.	1979	H	1250	S	St/---
257	4004-7830	B. Anderson	Jeff C. Pyle	1978	H	1160	S	Swc/---
258	4006-7830	H. Doerschuk	Gerald W. Clark	1978	H	1300	H	Sbm/---
259	4007-7834	J. Smith	Milford Frazier	1979	H	1180	S	Dbh/---
260	4006-7833	C. Corle	Gerald W. Clark	1978	H	1420	S	Dbh/sh
261	4006-7835	R. Lewis	Jeff C. Pyle	1979	H	1240	V	Doo/---
262	4005-7836	D. Morris	Milford Frazier	1978	H	1235	S	Doo/---
263	4004-7836	J. Lewis	do.	1979	H	1200	V	Dh/---
264	3959-7832	Clapper Wholesale Florist	Gerald W. Clark	1979	C	1260	S	Swc/---
265	4003-7834	M. E. Ferguson	do.	1978	H	1390	S	Ds/---
266	4003-7835	J. W. Mallory	do.	1978	H	1625	H	Ds/---
267	4002-7836	R. Whetstone	Jeff C. Pyle	1979	H	1450	S	Ds/---
268	4001-7835	S. Suters	do.	1978	H	1185	S	Doo/---
269	4000-7836	H. Smith	do.	1979	H	1145	S	Ds/---
270	3958-7832	R. Shaffer	do.	1979	H	1330	V	Swc/---
271	3957-7833	B. Hill	do.	1978	H	1395	S	Sbm/---
272	3957-7833	R. Phillips	do.	1978	H	1260	V	DSkt/---
273	3955-7834	Ted Brown	Gerald W. Clark	1979	H	1255	V	Dh/---
274	3956-7834	J. E. Eckard	do.	1977	H	1255	S	Dh/---
275	3956-7834	J. W. Lockard	do.	1979	H	1460	S	Doo/---
276	3959-7821	J. Chamberlain	do.	1978	H	1380	H	Df/sh
277	3958-7821	J. Felton	do.	1979	H	1340	H	Dck/sh
278	3959-7819	R. Clingerman	do.	1978	H	1260	H	Dck/---
279	3959-7819	Kenton Foor	do.	1978	H	1260	H	Dck/sh
280	3959-7821	C. E. Decker	do.	1978	H	1180	H	Df/sh
281	4000-7820	B. Baughman	do.	1978	H	1290	S	Df/---
282	4000-7819	R. Calhoun	do.	1979	H	1220	H	Dck/---
283	4000-7819	B. Foor, Jr.	do.	1979	H	1140	H	Dck/sh
284	3958-7816	B. Husick	do.	1979	H	1290	H	Dck/sh
285	3957-7817	D. R. Foor	do.	1978	H	1280	H	Dck/---
286	3956-7821	R. Greenawalt	do.	1978	H	1350	V	Dck/---
287	3956-7822	J. Stanton	do.	1979	H	1340	H	Dck/sh
288	3955-7817	J. Snyder	do.	1978	H	1460	S	Ds/sh
289	3955-7817	D. Weiger	do.	1980	H	1440	S	Ds/sh
290	3955-7817	I. Smith, Jr.	do.	1979	H	1485	H	Ds/sh
291	3955-7817	I. Smith, Sr.	do.	1978	H	1420	V	Df/sh
292	3957-7821	M. Williams	do.	1978	H	1320	S	Df/sh
294	3955-7819	C. and L. Shaw	do.	1978	S	1360	S	Df/sh
295	3956-7819	L. Stevey	do.	1979	H	1360	S	Df/sh
296	3956-7820	D. Pepple	do.	1978	S	1400	H	Df/sh
297	3956-7822	R. Hott	do.	1980	H	1320	S	Dck/sh
298	3954-7821	G. Clark	do.	1980	H	1400	S	Ds/sh
299	3954-7821	do.	do.	1980	H	1340	H	Ds/sh
300	3954-7821	A. Clark, Jr.	do.	1979	H	1340	H	Ds/sh
301	4012-7833	T. P. Benton	do.	1978	H	1210	F	Dbh/sh
302	4010-7828	D. Clark	Jeff C. Pyle	1978	H	1460	S	Ocl/---
303	4010-7824	O. Baker	Gerald W. Clark	1978	H	1255	F	Ons/ls
304	4012-7827	J. Teeter	do.	1979	H	1520	F	Ocl/ls
305	4011-7825	D. L. Phillips	do.	1979	H	1560	H	Cg/ls
306	4011-7825	J. Frederick	do.	1980	H	1520	S	Cg/ls
307	4011-7825	F. Imler	James R. Miller	1978	H	1390	F	Cg/ls
308	4012-7824	F. Slagerweit	do.	1977	H	1505	H	Cg/ls
309	4012-7825	S. L. Dively	Gerald W. Clark	1979	H	1420	S	Cg/ls
310	4011-7823	F. Gates	James R. Miller	1979	H	1220	S	Oba/ls
311	4010-7824	Manges Constr.	Gerald W. Clark	1978	H	1290	F	Ons/ls
312	4010-7824	G. Batzel	do.	1977	H	1340	H	Ons/ls
313	4009-7823	R. C. Hull	do.	1979	H	1310	F	Ons/ls
314	4009-7823	R. Ebersole	do.	1979	H	1170	S	Oba/ls
315	4009-7823	H & F Welding	do.	1978	N	1190	S	Ocl/ls
316	4011-7827	C. Leach	do.	1979	H	1600	S	Obe/sh
317	4000-7827	Dr. Barker	do.	1979	H	1145	S	Cw/---
318	4000-7827	C. Nycum	do.	1978	H	1095	S	Cw/ls
319	4000-7827	J. Fleming	Jeff C. Pyle	1979	H	1090	S	Cw/ls

(CONTINUED)

Total depth below land surface (feet)	Casing: Depth (feet)	Casing: Diameter (inches)	Depth(s) to water-bearing zone(s) (feet)	Static water level: Depth below land surface (feet)	Static water level: Date measured (mo/yr)	Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
78	21	6	20;60	10	7/79	15	.22	---	---	---	Bd-242
83	21	6	43;56	26	8/80	30	.52	---	---	---	243
218	20	6	73;197	50	12/77	20	.16	---	---	---	244
142	48	6	115	60	7/79	10	.17	5	190	---	245
101	23	6	23;38;90	10	8/80	15	.17	10	410	---	246
120	40	6	28;55;78	20	10/79	8	.13	---	---	---	247
43	21	6	28;32	5	10/78	30	.94	---	---	---	248
81	29	6	55;70	31	8/80	25	.40	5	170	---	249
140	24	6	60;130	10	11/79	8	.07	4	195	---	250
305	21	6	90;120	74	8/80	5	---	20	778	7.10	251
178	---	---	---	---	5/79	0	---	---	---	---	252
223	21	6	135;181;207	153	8/80	12	.32	18	678	---	253
438	21	6	190	27	8/80	2	.05	20	703	---	254
63	---	6	45;50	20	7/79	80	.18	---	---	---	255
78	38	6	50	30	4/79	5	.10	---	---	---	256
205	31	---	115	---	11/78	1	---	---	---	---	257
302	56	6	79;145;241	100	4/78	6	.03	---	---	---	258
42	11	6	15;35	---	9/79	2	---	---	---	---	259
153	---	6	140	80	8/80	15	.15	9	385	7.00	260
105	30	---	75	28	8/80	50	---	5	230	---	261
---	30	6	---	25	8/80	---	---	---	---	---	262
56	20	6	23;50	9	8/80	2	---	---	---	---	263
123	53	6	100;108	F	8/80	22	.22	9	295	---	264
162	22	6	100;144	50	7/78	8	.09	---	---	---	265
284	30	6	145;162	103	8/80	4	.06	7	285	7.45	266
105	20	---	60	26	8/80	20	---	---	---	---	267
65	34	---	40	18	8/80	10	---	10	315	---	268
225	26	---	200	20	10/79	20	---	---	---	---	269
225	39	---	45;140	---	4/79	3	---	10	375	7.3	270
245	9	---	35;85	16	8/80	2	---	---	---	---	271
165	21	---	130	4	8/80	20	---	18	620	---	272
121	20	6	105	4	8/80	15	---	---	---	---	273
238	24	6	118;168	0	11/77	2	.01	---	---	---	274
180	132	6	160	50	8/79	2	.01	3	125	---	275
83	21	6	33;42;68	25	8/80	20	.33	3	140	---	276
203	22	6	105;155;165; 185	58	8/80	6	.07	5	200	---	277
386	21	6	145	130	8/80	1	.02	6	255	---	278
223	23	6	93;102;112; 198	89	8/80	12	0.1	6	200	---	279
325	26	6	140;200;300	75	7/78	4	.02	---	---	---	280
168	21	---	80;147	70	8/80	6	.05	2	65	---	281
285	20	6	178;265	142	8/80	5	.03	4	195	---	282
243	21	6	170;229	150	5/79	45	.48	---	---	---	283
381	21	6	100;216;280; 370	100	12/79	15	.05	---	---	---	284
200	50	6	69;90;138; 197	32	8/80	15	.12	5	215	---	285
223	20	6	100;140;190; 195	58	8/80	12	.05	4	195	---	286
222	30	6	102;118;155; 172	80	8/79	5	.04	---	---	---	287
143	53	6	59;98;125	45	8/78	12	---	---	---	---	288
141	54	6	51;77;95; 132	30	4/80	15	.16	---	---	---	289
122	41	6	82;100	52	8/80	12	.30	---	---	---	290
123	---	6	78;85;117	20	11/78	50	.47	---	---	---	291
203	21	6	46;95;191	10	11/78	6	.03	---	---	---	292
163	25	6	60;82;130	25	9/78	10	.07	---	---	---	294
182	21	6	72;85;141	70	8/79	4	.04	---	---	---	295
223	84	6	148;186;210; 216	60	8/80	60	.42	4	160	---	296
168	80	6	58;147;155	F	2/80	18	.17	---	---	---	297
343	25	6	120;180	50	5/80	1	.003	---	---	---	298
163	40	6	75;145	57	8/80	8	.11	---	---	---	299
162	45	6	80;120	80	7/79	6	.15	6	240	---	300
120	22	6	17;24;98	6	6/78	6	.11	---	---	---	301
105	47	---	80	5	10/78	15	---	---	---	---	302
79	21	6	17;25;55	10	8/80	20	.63	10	265	---	303
80	25	6	70;73	5	8/80	20	.34	12	420	---	304
441	256	6	355;430;436	311	12/79	5	.06	---	---	---	305
366	181	6	301;357	200	1/80	30	.21	---	---	---	306
163	73	6	144;153	116	8/80	18	---	10	320	7.4	307
450	110	6	253	---	12/77	1	---	---	---	---	308
366	47	6	260;320;335	100	2/79	5	.01	---	---	---	309
101	97	6	98	36	8/80	50	---	---	---	---	310
140	110	6	98;118	80	5/78	20	.66	---	---	---	311
158	141	6	139;148	75	11/77	15	.24	---	---	---	312
326	20	6	140;280	113	8/80	3	.02	16	565	---	313
103	82	6	87	65	8/80	40	2.0	13	615	---	314
162	21	6	41;95	36	8/30	5	.10	16	600	---	315
138	23	6	30;65;120	10	8/79	50	.39	---	---	---	316
182	141	6	139;169	120	7/79	15	1.0	10	360	6.9	317
325	107	6	200;265;304; 317	78	8/80	50	.21	6	265	---	318
145	51	---	110;140	70	8/80	30	---	---	---	---	319

TABLE 16

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
8d-320	4000-7827	T. Weber	Gerald W. Clark	1978	H	1150	S	Cw/ss
321	4000-7827	R. J. Elbin	do.	1978	H	1090	S	Cw/ls
322	4001-7825	P. E. Mills	do.	1978	H	1205	S	Cg/ls
323	4001-7825	Ross Smith	do.	1978	H	1240	S	Cg/ls
324	4001-7825	R. Smith	do.	1978	H	1240	S	Cg/---
325	4003-7823	Ch. of the Brethren of Snake Spring Valley	do.	1978	T	1150	S	Obf/ls
326	3957-7833	Fred Feight	Milford Frazier	1978	H	1240	V	Doo/---
327	3957-7833	W. Feight	do.	1978	H	1260	S	Doo/---
328	3959-7828	P. A. Clark	Gerald W. Clark	1979	H	1240	S	Cg/ls
329	3957-7830	Roy Noonan	do.	1976	H	1550	S	Or/---
330	3956-7830	R. Everhart	Jeff C. Pyle	1978	H	1390	V	Ocl/ls
331	3954-7831	S. Kaltenbaugh	Larry G. Walters	1978	H	1305	H	Obf/ls
332	3955-7830	Charles Baker	Jeff C. Pyle	1980	H	1300	S	Obf/ls
333	3954-7831	R. Cessna	Gerald W. Clark	1978	H	1300	V	Ocn/ls
334	3953-7830	L. Cessna	do.	1979	H	1405	S	Ocn/---
335	3953-7830	W. Cessna	do.	1978	U	1405	S	Dcn/---
336	3953-7830	do.	do.	1978	H	1305	S	Ocn/ls
337	3957-7832	E. Studebaker	do.	1979	H	1260	S	Doo/ls
338	3959-7836	G. Wilkins	Jeff C. Pyle	1979	H	1230	S	DSkt/ls
339	3959-7835	D. Crissey	William C. Hall	1979	H	1510	S	Or/---
340	4000-7841	J. Beckner	Jeff C. Pyle	1977	H	1210	V	Dbh/---
341	4000-7841	do.	do.	1979	H	1200	V	Dbh/---
342	4000-7841	T. Beckner	do.	1979	H	1380	S	Dbh/---
343	4001-7840	Falklands Farm	Gerald W. Clark	1978	S	1250	S	Dh/sh
344	4001-7841	W. J. Gray	do.	1978	H	1298	S	Dh/sh
345	4002-7840	H. Miller	do.	1979	H	1325	H	Doo/---
346	4002-7838	Shawnee Valley Fire Co.	do.	1976	H	1210	V	Dh/---
347	4004-7837	A. Taranto	do.	1978	H	1430	S	Doo/---
348	4004-7838	W. Caldwell	do.	1978	H	1520	S	Doo/---
349	4005-7839	J. Stultz	do.	1979	H	1425	H	Dh/---
350	4007-7841	G. L. Miller	do.	1979	H	1560	S	Dck/---
351	4006-7839	E. Deremer	Jeff C. Pyle	1979	H	1420	S	Dbh/---
352	4007-7838	R. Anderson	Gerald W. Clark	1978	H	1235	V	Dh/---
353	4005-7842	R. Fox	do.	1979	H	1810	S	Dck/---
354	4003-7843	R. Reed	Jeff C. Pyle	1979	H	1605	S	Dck/---
355	4002-7842	A. Fletcher	Joseph R. Meinert	1978	H	1582	H	Ds/---
356	3959-7842	B. Dillnes	Jeff C. Pyle	1978	H	1430	S	Dbh/---
357	3959-7843	S. Householder	Gerald W. Clark	1980	H	1482	S	Dbh/sh
358	3959-7843	L. Geotz	Jeff C. Pyle	1978	H	1485	H	Dbh/---
360	3956-7837	Milligan Cove Ch.	Thomas Coyle	1972	T	1465	S	Or/sh
363	3956-7839	J. Suder	do.	1977	H	1420	V	Ds/---
364	3957-7839	A. D. Diehl	Gerald W. Clark	1979	H	1440	S	Ds/---
365	3958-7838	D. Reploqle	Thomas Coyle	1977	H	1510	S	Ds/---
366	3959-7840	D. Resnick	Gerald W. Clark	1980	H	1390	S	Ds/---
367	3959-7838	M. Nelson	Jeff C. Pyle	1979	H	1610	H	Ds/---
368	3959-7837	J. Harmon	Thomas Coyle	1977	H	1595	H	Ds/---
369	3959-7837	do.	do.	1977	S	1595	H	Ds/---
370	3959-7837	D. Wentz	do.	1977	H	1565	H	Ds/---
374	4009-7811	F. Crocker	Gerald W. Clark	1979	H	1640	S	Pc/---
375	4009-7811	A. Black	do.	1978	H	1640	V	Pa/---
376	3955-7824	K. Grimes	do.	1980	H	1400	V	Df/---
377	3954-7822	G. Miller	do.	1978	H	1420	S	Df/sh
378	3955-7823	R. Mallow	do.	1980	H	1460	S	Dck/---
379	3954-7822	C. J. Morse	do.	1978	H	1420	H	Df/sh
380	3954-7822	S. Morral	do.	1980	H	1320	S	Ds/sh
381	3954-7822	J. Morral	do.	1980	I	1420	S	Df/sh
[illegible]	3955-7823	C. J. Furlong	do.	1978	S	1550	S	Df/sh
[illegible]	3959-7827	Kingdom Hall	do.	1978	T	1260	V	Cg/ls
384	3959-7826	Jack Diehl	do.	1977	H	1180	V	Ons/ls
385	3958-7826	Paul Deasy	do.	1979	H	1180	S	Ob/ls
386	3958-7829	H. Turner	Jeff C. Pyle	---	H	1380	V	Cg/ls
387	3958-7828	D. Long	Gerald W. Clark	1980	H	1390	S	Cg/---
388	3958-7829	L. Albright	Jeff C. Pyle	1977	H	1365	H	Cg/ls
389	3958-7829	Fred Hagenbuch	Gerald W. Clark	1978	H	1480	S	Cg/ls
390	3957-7829	D. Hunt	Jeff C. Pyle	1980	H	1420	V	Cg/ls
391	3959-7827	G. Feathers	Gerald W. Clark	1979	H	1240	V	Cg/ls
392	3958-7826	Ash	do.	1979	H	1220	H	Ob/ls
393	3958-7824	F. Clingerman	do.	1977	H	1230	S	Swc/ls
394	3958-7824	Dean Grubb	do.	1977	H	1220	S	Swc/ls
395	3958-7823	J. Burget	do.	1978	H	1140	S	Dh/sh
396	3954-7826	R. L. Barthelow	do.	1978	H	1340	S	DSkt/sh
397	3954-7827	J. Williams	do.	1978	H	1380	S	DSkt/sh
398	3955-7826	Ronald Cogan	do.	1978	H	1300	S	DSkt/---
399	3959-7823	E. B. Robinson	do.	1978	H	1080	F	DSkt/ls
400	3951-7824	J. Davis and R. Morse	do.	1978	H	1540	S	Ds/sh
401	4003-7823	D. Miller	do.	1979	H	1145	S	Obf/ls
402	4005-7823	H. C. Cottle	do.	1978	H	1480	S	Or/sh
403	4008-7837	J. Egolf	do.	1979	H	1220	F	Dh/sh
404	4008-7838	T. Eichler	do.	1979	H	1290	S	Dbh/sh
405	4009-7840	L. Heidorn	do.	1979	H	1520	S	Df/---
406	4012-7839	Ronald Gohn	do.	1976	H	1970	S	Dck/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25 °C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
182	164	6	163	70	8/78	16	.23	---	---	---	8d-320
182	21	6	60;176	20	5/78	150	1.1	---	---	---	321
102	44	6	80	70	8/80	8	.13	16	555	---	322
264	61	6	140;194	100	9/78	6	.07	---	---	---	323
571	21	6	115;184	150	10/78	2	.07	---	---	---	324
243	21	6	98;108;209	50	10/78	10	.07	---	---	---	325
53	41	6	45	---	6/78	5	---	16	453	---	326
80	22	6	65	18	8/80	5	---	---	---	---	327
100	20	6	68;77	40	10/79	10	0.4	---	---	---	328
223	50	6	45;55;180	59	8/80	5	---	4	145	---	329
225	28	---	45	25	10/78	2	---	---	---	---	330
125	20	6	40;115	20	5/78	5	---	19	613	---	331
125	30	---	80	40	8/80	30	---	18	595	7.4	332
285	35	6	32;80;182;237	30	3/78	5	.04	11	365	---	333
200	67	6	71	55	8/80	4	.03	10	365	---	334
43	---	---	---	---	10/78	0	---	---	---	---	335
202	61	6	191	39	8/80	4	.03	---	---	---	336
141	20	6	60;120	F	10/79	20	.16	---	---	---	337
165	51	---	60;135	29	8/80	30	---	13	515	7.2	338
95	25	6	65;90	36	12/79	12	---	5	175	---	339
145	20	---	80;115;130	---	8/77	10	---	---	---	---	340
85	22	---	40;55	---	11/79	50	---	11	470	7.2	341
305	20	---	65	99	8/80	1	---	---	2090	7.2	342
361	---	6	---	20	8/78	4	.01	21	703	---	343
223	21	6	30	30	6/78	3	---	6	385	---	344
103	73	6	72;88	78	8/79	15	---	6	228	---	345
360	22	6	63;242;293;341	0	5/76	10	.02	13	460	---	346
203	61	6	90;120;150	50	7/78	8	.08	5	185	6.96	347
325	163	6	241;291;302	150	7/78	10	.09	7	245	---	348
182	22	6	78;105	27	8/80	8	.07	15	540	7.1	349
140	20	6	125	40	11/79	10	---	---	---	---	350
205	20	---	80	15	10/79	2	---	---	---	---	351
230	21	6	60;215	20	11/78	32	.17	9	365	---	352
244	29	6	60;180;198;228	60	5/79	25	.17	6	245	6.8	353
225	20	---	25;50;170	41	8/80	3	---	3	130	6.9	354
195	20	6	180	56	6/78	4	---	8	280	---	355
205	21	6	100;170	22	8/80	4	---	6	280	---	356
300	21	6	60;240	20	5/80	2	.01	---	---	---	357
305	21	---	75	26	8/80	1	---	9	335	---	358
60	35	6	55	35	10/72	10	---	---	---	---	360
38	20	6	30	6	6/77	7	---	---	---	---	363
121	20	6	29	0	9/79	3	.15	---	---	---	364
225	20	6	56	56	10/77	---	---	---	---	---	365
583	21	6	90;140	80	4/80	1	.02	---	---	---	366
125	21	---	80;95;115	25	4/79	30	---	---	---	---	367
145	22	6	105;140	41	8/77	4	---	---	---	---	368
100	20	6	92	73	8/80	7	---	---	---	---	369
125	25	6	95;120	85	9/77	3	---	11	380	---	370
338	113	6	315;335	268	2/79	3	.04	---	---	6.7	374
142	42	6	90	19	7/78	2	.01	---	---	---	375
160	20	6	60;136	9	8/80	8	.06	4	290	---	376
182	21	6	144;158;164	57	8/80	35	.30	6	240	---	377
223	20	6	181;205	80	3/80	12	.12	---	---	---	378
143	21	6	30;42;112	60	8/78	15	.18	---	---	---	379
83	39	6	53;65	32	8/80	20	.83	---	---	---	380
183	19	6	40;100	42	8/80	12	.07	5	235	---	381
182	22	6	34;120;168	92	8/80	30	.20	5	250	---	382
202	106	6	180	152	2/78	20	---	---	---	---	383
120	105	6	110	95	12/77	10	---	---	---	---	384
80	81	6	78	55	8/80	15	1.25	10	280	---	385
245	204	---	198;215	---	---	25	---	---	---	---	386
326	50	6	74;285	40	5/80	5	.02	---	---	---	387
245	20	---	120;190	145	8/80	2	---	14	450	6.7	388
332	50	6	245	180	8/80	15	---	10	265	6.8	389
151	151	---	130	108	8/80	20	---	---	---	---	390
320	21	6	240;304	170	1/79	15	---	---	---	---	391
180	62	6	177	120	5/79	20	---	---	---	---	392
323	56	6	130;148;248;300	40	12/77	10	.03	7	300	---	393
263	58	6	60;134;234	40	11/77	8	.04	7	320	---	394
82	21	6	42;63	20	10/78	8	.13	4	185	---	395
182	41	6	156;167	100	11/78	7	.10	---	---	---	396
320	30	6	210;258;300	80	7/78	15	.07	6	235	6.9	397
240	90	6	236	109	8/80	20	.15	5	220	---	398
108	---	6	62;95	0	10/78	5	.05	---	---	---	399
83	44	6	60;70	23	8/80	40	.83	4	165	---	400
79	20	6	60;71	30	4/79	10	.5	---	---	---	401
120	52	6	75;85	55	8/80	8	.25	5	140	---	402
202	28	6	35;78;110;185	12	1/79	12	.06	---	---	---	403
140	28	6	16;58;98	11	8/80	3	.04	---	---	---	404
103	20	6	80;86;90	26	8/80	60	.88	11	445	7.4	405
163	57	6	94;143	93	9/76	5	.10	---	---	---	406

TABLE 16.

Well location: Number	Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/litholog
8d-407	4011-7839	M. Foust	Gerald W. Clark	1979	H	1850	S	Dck/---
408	4011-7839	W. Osman	do.	1979	H	1500	V	Dck/---
409	4013-7838	A. Tessari	do.	1978	H	1950	S	Dck/---
410	4013-7821	Woodbury Mennonite Ch.	James R. Miller	1978	H	1345	H	Oba/ls
411	4013-7821	P. D. Steele	Gerald W. Clark	1979	H	1400	S	Oba/ls
412	4013-7820	J. W. Koontz	do.	1979	H	1485	S	Or/sh
413	4013-7820	G. Yoder	do.	1979	H	1420	F	Ocl/ls
414	4008-7820	Northern Bedford Sch.	do.	1979	T	970	F	Swc/ls
415	4008-7819	L. McIlnay	do.	1978	H	960	S	Sc/sh
416	4009-7820	E. C. Burkett	do.	1978	H	1040	S	Sc/sh
417	4008-7816	J. Brannock	do.	1979	H	930	S	MOr/---
418	4007-7815	V. College	do.	1978	H	980	S	Pa/ss
419	4009-7815	Tri County Petroleum, Inc.	do.	1976	N	870	F	Mmc/---
420	4009-7813	Dennis Drenning	Donald W. Graham	1975	H	1120	S	Pc/sh
421	4009-7815	W. Hastings	Gerald W. Clark	1979	H	880	V	Mmc/sh
422	4013-7816	F. Kormanski	Glenn E. Houp	1979	H	980	S	Dh/---
423	4013-7816	Ralph Steel	do.	1979	H	980	V	Dh/---
424	4013-7816	Chadwicks Esso	do.	1979	C	980	S	Dh/---
425	4009-7835	R. Kring	Gerald W. Clark	1978	H	1350	S	Doo/ls
426	3951-7824	M. Barkman	do.	1979	H	1490	S	Ds/sh
427	3951-7823	J. Davis	Jeff C. Pyle	1978	H	1420	S	Df/---
428	3951-7824	H. Dean	do.	1978	H	1320	H	Df/---
430	3951-7824	R. Dickens	Gerald W. Clark	1979	H	1600	H	Df/sh
435	4001-7813	P. Millin	do.	1979	H	1300	H	Dck/---
436	4000-7813	Paul Peck	do.	1977	H	1340	H	Dck/sh
437	4003-7814	K. Karns	do.	1978	H	1370	S	Df/sh
438	3959-7814	J. Howsare	do.	1979	H	1350	F	Dck/---
439	3959-7814	O. Felton	do.	1979	H	1350	H	Dck/---
440	3959-7814	P. Whitfield	do.	1979	H	1350	H	Dck/---
441	3959-7814	Wiltshire Motel	do.	1980	C	1340	F	Dck/---
442	3959-7814	M. Bittner	Paul N. Wright	1978	H	1355	H	Dck/---
443	3959-7814	John Nebel	Gerald W. Clark	1978	H	1300	S	Dck/---
444	3959-7814	H. Nave	do.	1978	H	1340	S	Dck/---
445	4000-7822	O. H. Clark	do.	1978	H	1060	S	Dbh/sh
446	4000-7822	W. Pupo	do.	1978	H	1120	S	Dh/sh
447	4001-7822	C. Stone	do.	1979	H	1100	S	Dh/sh
448	3959-7814	J. I. Foor	do.	1980	H	1360	H	Dck/sh
449	4003-7821	Everett Munic. Authority	Harrisburg's Kohl Bros.	1966	U	1140	S	Swc/---
451	4009-7812	A. Black	Gerald W. Clark	1978	U	1605	S	Pa/---
452	4008-7811	E. Putt	do.	1978	H	1665	V	Pa/---
453	4008-7813	G. Sheeder	do.	1978	U	1390	S	Pc/---
454	4008-7813	do.	do.	1978	H	1390	S	Pc/---
455	4008-7813	do.	do.	1979	H	1390	S	Pc/---
456	4012-7814	D. O. Long	do.	1979	H	930	V	Dck/---
457	4011-7812	Coaldale Water Co.	do.	1978	P	1415	V	Pc/---
458	4011-7812	do.	do.	1978	P	1415	V	Pc/---
459	4009-7825	New Enterprise Water Assoc.	---	1967	P	1331	---	Ons/---
460	4001-7822	New Enterprise Stone and Lime	Gerald W. Clark	1978	C	1230	S	Swc/---
461	3959-7814	Holiday Inn-Breezewood	do.	1973	C	1320	S	Dck/---
462	4000-7814	Penn Aire Motel	---	1980	C	1300	S	Dck/---
463	4011-7821	Waterside-Loysburg Water Co.	---	1961	P	1460	W	Or/---
464	4013-7820	Bor. of Woodbury	---	1966	P	1520	W	Or/---
465	4010-7813	Stony Hollow Water Works	---	---	U	---	W	Pc/---
466	4007-7835	Fishertown Water Assoc.	---	1966	P	1360	W	Doo/---
467	4007-7835	do.	---	1966	P	1355	W	Doo/---
468	4009-7830	Osterburg Water Co.	---	---	P	1141	V	Dh/---
469	3959-7814	Breezewood Bonanza	Gerald W. Clark	1978	C	1330	S	Dck/---
470	3959-7814	Breezewood Motel	do.	1978	C	1310	V	Dck/---
471	4001-7829	Hedstrom Company	do.	1978	N	1070	V	DSkt/---
472	4009-7835	Pleasantville Water Authority	---	1972	P	1245	S	Doo/---
473	4002-7822	West Providence Twp. Ind. Development Authority	---	1965	N	1370	S	Sbm/---
474	4000-7831	Bedford Munic. Water Authority	---	1969	U	1215	S	Sc/---
475	4013-7819	Bor. of Woodbury	---	1965	P	1720	S	Oj/---
476	4009-7835	G. Radford	Gerald W. Clark	1978	H	1325	S	Doo/---
477	4013-7836	O. Allison	do.	1978	H	1550	V	Dck/sh
478	4014-7831	R. Fickes	do.	1979	H	1330	S	Dbh/sh
479	4014-7831	J. Feathers	do.	1978	H	1290	V	Dbh/sh
480	4017-7825	D. Hoover	James R. Miller	1978	H	1480	S	Or/---
481	4017-7825	M. Hoover	do.	1978	H	1470	S	Or/sh
482	4015-7824	B. Foor	Fred D. Albright	1978	H	1550	F	Cg/ls
483	4005-7825	S. Dibert	Gerald W. Clark	1978	S	1210	S	Swc/ls
484	4006-7828	C. Hershberger	do.	1979	H	1370	S	DSkt/ls

(CONTINUED)

Total depth below land surface (feet)	Casing Depth (feet)	Casing Diameter (inches)	Depth(s) to water-bearing zone(s) (feet)	Static water level Depth below land surface (feet)	Static water level Date measured (mo/yr)	Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25 C)	pH	Well number
305	20	6	223	180	11/79	1	.03	---	---	---	Bd-407
40	20	6	23;30	15	8/80	20	.57	3	120	6.8	408
530	20	6	242;500	280	8/80	10	.04	1	230	7.1	409
150	135	6	136	117	8/80	30	---	16	420	---	410
346	20	6	90;109;244	50	9/79	5	.03	---	---	---	411
58	20	6	30;39	15	8/80	50	2.1	4	165	7.5	412
120	21	6	52;58;100	40	3/79	12	.30	---	---	---	413
100	40	6	23;32;53	8	8/79	30	1.0	---	---	---	414
100	25	6	20;31;85;98	0	10/78	15	.25	---	---	---	415
120	86	6	78;95	30	7/78	10	.20	---	---	---	416
100	36	6	57;70	40	8/79	8	.26	---	---	---	417
42	21	6	30	4	5/78	25	1.3	---	---	---	418
103	25	6	80;88;93	25	11/76	60	1.0	---	---	---	419
47	25	6	35;45	10	8/75	20	2.0	---	---	---	420
90	30	6	23;58;73	20	8/80	25	.83	7	315	---	421
110	21	6	45;70;90	4	8/80	12	---	16	565	---	422
50	21	6	28;39	6	8/80	11	---	---	---	---	423
270	21	6	90;165;195	55	9/79	4	---	---	---	---	424
421	102	6	200	140	9/80	2	.01	65	1400	7.5	425
93	47	6	63;73	23	8/80	15	.20	4	115	7.6	426
165	21	---	50;100;145	---	7/78	15	---	---	---	---	427
125	47	---	65;90	---	8/78	10	---	---	---	---	428
163	58	6	78;101;120;140	84	8/80	10	.11	---	---	---	430
408	20	6	12;200;292;387	200	12/79	6	.03	4	180	7.6	435
163	20	6	128	80	9/80	10	.12	3	140	---	436
140	45	6	98;112;125	23	9/80	20	.27	2	105	---	437
260	27	6	220;240	180	5/79	8	.13	6	155	---	438
240	36	6	155;165;218	150	5/79	30	.43	---	---	---	439
198	---	6	170	160	6/79	5	.13	4	155	---	440
560	33	6	525;560	200	9/80	30	.09	6	265	---	441
475	---	6	---	160	5/78	5	.02	---	---	---	442
264	26	6	100;223;240	69	9/80	7	.05	5	250	---	443
400	21	6	305;340;380	150	11/78	6	.03	---	---	---	444
425	---	6	340	---	11/78	4	---	---	---	---	445
102	31	6	60;85	20	7/78	15	.24	---	---	---	446
400	46	6	140	150	4/79	3	.01	---	---	---	447
203	40	6	170	152	6/80	30	.97	---	---	---	448
400	36	8	150;330	0	9/66	10	.05	---	---	---	449
162	---	6	112	---	7/78	1	---	---	---	---	451
182	66	6	135;175	40	9/80	2	.01	4	185	---	452
121	21	6	---	---	3/78	0	---	---	---	---	453
123	19	6	123	103	4/78	4	0.2	---	---	---	454
80	24	6	46;75	15	1/79	4	.06	---	---	---	455
280	43	6	50	52	9/80	2	.01	10	370	---	456
99	23	6	19;28	20	11/78	7	0.8	11	430	7.3	457
100	25	6	75;78;90;98	50	11/78	45	.8	9	360	---	458
165	92	6	130;140	70	---	150	---	---	---	---	459
123	82	6	93	50	11/78	6	.08	---	---	---	460
303	44	6	133;145;196;238	130	8/73	100	---	---	---	---	461
580	40	6	120;200;300;500	100	2/80	80	.17	---	---	---	462
300	40	6	---	---	---	42	---	---	---	---	463
320	27	6	50;120;300	---	---	45	---	---	---	---	464
139	---	6	---	---	---	4	---	---	---	---	465
140	119	6	---	---	---	10	---	---	---	---	466
154	118	6	---	---	---	16	---	---	---	---	467
235	150	6	---	---	---	17	---	---	---	---	468
360	42	6	240;335	100	6/78	100	.42	---	---	---	469
480	40	6	358;480	100	3/78	100	.67	---	---	---	470
141	24	8	55;58;70;120	20	10/78	100	1.7	---	---	---	471
332	136	---	---	---	---	200	---	---	---	---	472
270	113	6	170	76	10/77	31	.78	---	---	---	473
200	20	8	---	20	---	55	.39	---	---	---	474
262	42	6	---	---	---	25	---	---	---	---	475
380	143	6	141;280	80	9/78	3	.01	---	---	---	476
223	20	6	21;45;107	28	9/80	3	.01	8	400	7.1	477
228	---	6	---	50	12/79	4	.02	---	---	---	478
263	20	6	22;78	6	8/78	3	.01	---	---	---	479
110	20	6	50;85	---	6/78	6	---	---	---	---	480
130	21	6	110;120	---	10/78	40	---	---	---	---	481
295	161	6	290	270	4/78	15	---	---	---	---	482
143	30	6	42;82;128	30	12/78	25	.22	---	---	---	483
264	176	6	233	227	1/79	8	---	16	410	7.3	484

TABLE 16.

Well location								
Number	Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Bd-485	4006-7829	B. Hinson	Gerald W. Clark	1979	H	1255	S	Swc/ls
486	4003-7827	J. Mellott	do.	1978	H	1105	S	Dh/sh
487	4004-7829	M. Salz	do.	1978	H	1220	S	Doo/sh
488	4004-7829	D. May	do.	1979	H	1185	S	Dh/ss
489	4016-7822	R. Eicher	do.	1979	H	1375	S	Cg/ls
490	4016-7823	G. Poet	do.	1978	H	1420	S	Cg/ls
491	4018-7834	G. Giles	James R. Miller	1978	H	2345	S	Dck/---
492	4015-7835	Mt. Zion United Ch. of Christ	Gerald W. Clark	1978	T	1480	S	Dck/---
493	4016-7837	Brown	Jeff C. Pyle	1978	H	1900	S	Dck/---
494	4016-7830	B. Turner	Gerald W. Clark	1977	H	1615	S	Ds/sh
495	4009-7831	S. Corle	Jeff C. Pyle	1979	H	1155	F	Dbh/---
496	4010-7831	B. Brown	Gerald W. Clark	1978	H	1170	S	Doo/ss
								BLAIR
Ma- 1	4019-7819	Irvin Stoner	---	---	H	1420	S	Oba/dol
5	4016-7820	Abbots Dairy	Albright & Hillard	---	N	1440	S	Ons/dol
9	4018-7822	Howard Burket	do.	1933	H	1410	S	Oba/dol
17	4027-7825	Altoona Packing Co.	Wissinger	---	U	1060	V	Dh/---
18	4026-7823	J. C. Lang	Albright & Hillard	---	I	990	V	Sc/ls
19	4025-7824	Thermic Coal & Coke Co.	Wissinger	---	Z	970	V	Sc/ss
25	4026-7818	H. D. Winter	Albright & Hillard	1932	H	960	S	Dbh/sh
33	4034-7857	Altoona Northern R.R.	---	1918	U	2480	H	Mp/ss
37	4031-7824	West Altoona Ice Co.	Albright & Hillard	---	N	1300	V	Dlh/sh
38	4031-7824	Penn Alto Hotel	Wissinger	1922	A	1230	S	Dlh/---
40	4031-7822	East End Ice Co.	Albright & Hillard	1931	N	1210	S	OSkt/ls
41	4031-7823	Caums Ice Cream	---	1908	N	1200	S	Dh/ss
42	4030-7823	Harshburger Dairy Co.	Wissinger	1928	A	1140	V	Oh/ls
43	4030-7823	F. R. McMahon Dairy Co.	Albright & Hillard	---	A	1150	S	Sc/sh
44	4030-7823	United Home Meat Co.	Wissinger	---	N	1140	V	OSkt/ss
45	4029-7824	Blair Ice & Cold Storage Co.	Albright & Hillard	1932	N	1110	V	DSkt/sh
46	4028-7825	R. A. Book	Wissinger	---	I	1090	V	Doo/sh
60	4040-7814	West Virginia Pulp & Paper Co.	Albright & Hillard	1933	U	910	V	DSkt/ls
61	4040-7814	do.	L. E. Gladfelter	---	N	920	V	Dh/ls
62	4040-7814	do.	do.	---	U	910	V	Swc/sh
63	4040-7814	Waple Dairy	---	1924	A	900	V	DSkm/sh
64	4040-7814	Shaffer Meat Plant	Albright & Hillard	1932	A	890	V	Sc/sh
67	4018-7833	Blue Knob Development Corp.	H. A. Stormer & Son	1953	---	2038	W	Dck/---
68	4018-7833	do.	Donald E. Foor	1966	---	1060	W	Dck/---
71	4040-7814	Bor. of Tyrone	Moody Drilling Co., Inc.	1967	---	930	V	Doo/ls
72	4040-7814	do.	do.	1967	---	935	V	Doo/---
73	4040-7814	do.	do.	1967	---	930	V	Doo/---
74	4024-7827	U. S. Geol. Survey	Melvin R. Sensebaugh	1969	U	1130	S	Dbh/sh
75	4029-7817	Blairmont Country Club	Moody Drilling Co., Inc.	1968	U	960	V	Swc/ls
76	4017-7827	Claysburg Ind. Park #1	do.	1975	N	1180	V	Dh/---
77	4017-7827	Altoona Enterprises Inc.	do.	1968	---	1160	V	Dh/ss
78	4017-7827	Claysburg Ind. Park #1	do.	1975	N	1160	V	Dh/---
79	4024-7827	U. S. Oept. of Interior	---	---	H	1260	S	Dbh/---
85	4030-7822	Thomas Hufford	---	---	H	1180	V	Sbm/---
86	4030-7822	Kaufman	---	---	H	1200	S	DSkt/---
87	4031-7821	Clair Storrs	---	---	H	1230	S	DSkt/---
88	4034-7819	Hunt's Farm Market	---	---	C	1121	S	Swc/---
89	4034-7821	Ken Worley	---	---	H	1120	S	Obh/---
90	4035-7821	Fred Bush	---	---	H	1120	S	Obh/---
91	4033-7821	John Blatt	---	---	H	1175	S	DSkt/---
92	4033-7821	Russell Bigelow	---	---	H	1135	V	Doo/---
93	4031-7822	H. D. Berry	---	---	H	1170	V	Doo/---
94	4031-7821	John Robinson	---	---	H	1210	V	DSkt/---
95	4031-7821	Greenwood United Methodist Ch.	---	---	T	1215	V	DSkt/---
96	4032-7821	Ken Pine	---	---	H	1217	S	Swc/---
97	4037-7821	W. R. Yingling	---	---	H	1265	V	Dlh/---
99	4033-7821	Robert Cross	---	---	H	1170	H	DSkt/---
100	4032-7821	Ross Trailer Park	---	---	C	1215	S	Sbm/---
101	4032-7820	do.	---	---	C	1225	S	Sbm/---
102	4032-7821	do.	---	---	C	1225	S	Sbm/---
103	4032-7821	Gene Pine	---	---	H	1165	V	Swc/---
104	4031-7821	Howard McIntire	---	---	H	1255	S	Sbm/---
105	4131-7821	M. C. Ainsworth	---	---	H	1255	W	Sbm/---
106	4031-7821	Jean High	---	---	H	1235	S	Swc/---
107	4029-7826	Don Stiver	---	---	H	1160	V	OSkt/---
108	4032-7821	David Vipond	---	---	H	1210	V	DSkt/---
109	4029-7825	William Ajay	---	---	H	1150	V	Dbh/---
111	4032-7821	Ken Beck	---	---	H	1175	V	Swc/---
112	4029-7825	Jes Kensinger	---	---	H	1145	V	Dbh/---
114	4032-7821	Ralph Brubaker	---	---	H	1219	S	Sbm/---
115	4037-7822	Dale O'Shell	---	---	H	1345	V	Dck/---
116	4037-7822	McCloskey	---	---	H	1350	S	Dck/---
117	4036-7821	John Naugle	---	---	H	1280	W	Olh/---
118	4036-7821	Curt Parshall	---	---	H	1280	S	Dlh/---
119	4033-7820	Phillip Dracup	---	---	H	1223	S	Doo/---
120	4033-7820	John Miller	---	---	H	1115	S	Sbm/---
121	4036-7821	Fred Lambert	---	---	H	1285	S	Dbh/---

(CONTINUED)

Total depth below land surface (feet)	Casing Depth (feet)	Casing Diameter (inches)	Depth(s) to water-bearing zone(s) (feet)	Static water level Depth below land surface (feet)	Static water level Date measured (mo/yr)	Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
160	46	6	120;140	81	9/80	8	.40	19	530	7.8	8d-485
284	20	6	18;77	30	2/78	1	.02	---	---	---	486
223	150	6	160	75	6/78	3	.03	---	---	---	487
150	108	6	60;150	20	6/79	7	.11	---	---	---	488
244	20	6	120;151	117	9/80	3	.10	14	455	7.3	489
168	168	6	95;168	135	10/78	30	---	---	---	---	490
325	20	6	160;225	---	6/78	1	---	---	---	---	491
143	41	6	50;130	50	5/78	8	.9	---	---	---	492
225	21	---	45	---	9/78	2	---	---	---	---	493
218	21	6	49;62	10	11/77	5	.09	---	---	---	494
165	40	---	60	15	8/80	2	---	10	405	7.22	495
81	79	6	60;78	52	8/80	30	0.1	5	165	---	496
COUNTY											
180	12	6	---	50	---	9	.90	---	---	---	Ba- 1
147	125	6	---	40	---	32	3.2	---	---	---	5
89	12	6	---	12	---	9	.64	---	---	---	9
300	30	10	---	---	---	3	---	---	---	---	17
184	15	6	---	12	---	30	.21	---	---	---	18
496	40	8	---	48	---	386	---	---	---	---	19
198	28	6	---	18	---	6	.15	---	---	---	25
200	---	6	---	50	---	20	---	---	---	---	33
150	30	8	---	12	---	30	.27	---	---	---	37
260	30	8	---	13	---	22	.73	---	---	---	38
129	42	8	---	40	---	60	---	---	---	---	40
212	25	8	---	40	---	300	.50	---	---	---	41
235	35	8	---	30	---	125	2.1	---	---	---	42
555	24	8	---	20	---	10	---	---	---	---	43
225	20	8	---	---	---	125	---	---	---	---	44
504	---	8	---	40	---	75	1.2	---	---	---	45
180	---	8	---	3	---	30	1.5	---	---	---	46
356	175	8	---	6	---	315	---	---	---	---	60
313	70	6	---	28	---	380	3.3	---	---	---	61
330	100	10	---	15	---	20	---	---	---	---	62
155	20	6	---	16	---	50	---	---	---	---	63
150	28	8	---	6	---	30	.60	---	---	---	64
240	40	8	---	99	7/66	10	---	---	---	---	67
500	48	6	---	110	---	10	---	---	---	---	68
397	23	6	---	23	1967	55	.37	---	---	---	71
382	29	6	---	11	1967	400	7.4	---	---	---	72
370	---	6	---	11	9/67	100	5.0	---	---	---	73
150	14	6	---	20	6/59	2	.08	8	390	---	74
350	47	8	---	32	10/68	55	.89	21	---	7.3	75
483	203	9	220;270;476	0	8/75	350	1.1	---	---	---	76
361	21	8	---	---	---	20	---	---	---	---	77
695	250	8	361;480;635	0	8/75	150	.64	---	---	---	78
55	---	---	---	51	4/73	---	---	---	---	---	79
96	---	6	---	10	10/72	20	.51	---	---	---	85
120	---	6	---	74	9/73	32	1.8	---	---	---	86
92	---	6	---	41	9/73	100	4.9	---	---	---	87
90	---	6	---	51	8/72	1	.07	---	---	---	88
39	---	6	---	14	9/73	1	.16	---	---	---	89
110	34	6	---	15	8/72	2	.05	---	---	---	90
124	---	6	---	30	8/73	5	.11	---	---	---	91
75	---	6	---	6	9/73	17	.59	---	---	---	92
25	---	6	---	9	9/73	1	.22	---	---	---	93
186	---	6	---	95	9/73	29	.71	---	---	---	94
---	---	6	---	86	9/73	2	.06	---	---	---	95
68	---	6	---	25	9/73	13	.76	---	---	---	96
57	40	6	---	6	9/73	4	.19	---	---	---	97
118	---	6	---	49	9/73	1	.04	---	---	---	99
145	---	6	---	48	9/73	4	.09	---	---	---	100
250	---	6	---	52	9/73	8	.08	---	---	---	101
210	---	6	---	3	9/73	8	.08	---	---	---	102
85	---	6	---	34	9/73	2	.19	---	---	---	103
65	---	6	---	26	5/73	20	1.4	---	---	---	104
50	---	6	---	13	5/73	---	.73	---	---	---	105
90	60	6	---	43	9/73	---	1.5	---	---	---	106
75	---	6	---	3	7/73	---	.07	---	---	---	107
95	---	6	---	45	9/73	---	1.2	---	---	---	108
70	---	6	---	16	9/73	---	.19	---	---	---	109
80	---	6	---	13	9/73	---	6.6	---	---	---	111
35	---	6	---	10	9/73	---	.12	---	---	---	112
65	---	6	---	19	9/73	---	.33	---	---	---	114
74	---	6	---	11	8/73	---	.25	---	---	---	115
100	---	6	---	10	9/73	---	.12	---	---	---	116
110	---	6	---	45	8/73	---	.29	---	---	---	117
94	---	6	---	37	8/73	---	.10	---	---	---	118
206	206	6	---	171	8/73	---	2.1	---	---	---	119
87	55	6	---	25	9/73	---	1.0	---	---	---	120
168	---	6	---	61	8/73	---	.07	---	---	---	121

TABLE 16.

Well location								
Number	Lat-Long	Owner	Oriller	Oate completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ lithology
8a-122	4033-7820	William Ward	---	---	H	1080	V	Swc/---
123	4033-7820	John Howard	---	---	H	1145	S	Sbm/---
125	4031-7822	Ted Long	---	---	H	1260	S	Swc/---
126	4029-7825	Azzarello	---	---	H	1155	V	Obh/---
127	4032-7820	Jim Lantz	---	---	H	1110	S	Sbm/---
128	4033-7820	do.	---	---	H	1100	V	Swc/---
129	4028-7826	Richard Adams	---	---	H	1165	S	Obh/---
130	4028-7826	Gilbert Cornelius	---	---	H	1095	V	Obh/---
131	4029-7825	Joseph Knab	---	---	H	1161	V	Obh/---
132	4033-7820	Dominick	---	---	H	1110	S	Swc/---
133	4034-7821	Claude Barr	---	---	H	1158	H	Obh/---
135	4034-7821	Chester Parshall	---	---	H	1090	V	Dbh/---
136	4035-7820	Thomas Balkavich	---	---	H	1080	V	Ooo/---
137	4028-7823	Paul Walker	---	---	H	1180	S	Sc/---
138	4028-7823	G. W. Delozier	---	---	H	1120	S	Sc/---
139	4033-7819	Mary Crain	---	---	H	1140	S	Sbm/---
142	4035-7820	Joseph Caroselli	---	---	H	1078	V	Ooo/---
143	4035-7819	Randall Miller	---	---	H	1040	V	DSkt/---
144	4035-7820	Nancy McCloskey	---	---	H	1075	V	DSkt/---
145	4034-7820	A. J. Servello	---	---	H	1080	V	OSkt/---
146	4033-7821	Russell Bigelow	---	---	H	1166	W	Doo/---
147	4032-7822	Clark	---	---	H	1185	S	DSkt/---
148	4030-7811	8rubaker Farms	James R. Miller	1975	S	1048	S	Ons/---
149	4031-7811	R. Smith	Donald W. Graham	1978	H	1032	H	Ons/---
150	4032-7810	J. McCullough	James R. Miller	1976	H	950	H	Cgm/---
151	4031-7811	Michael Fay	do.	1975	H	1000	S	Ons/---
152	4031-7810	J. Oavis	do.	1979	H	790	V	Ons/---
153	4030-7810	T. Fisher	do.	1978	H	830	V	Oba/---
154	4032-7821	C. Goon, Jr.	Harold E. Ritchey	1978	H	1265	S	Ooo/---
155	4032-7821	Pete Russo	do.	1978	H	1270	S	Ooo/---
156	4032-7821	C. Johnson	do.	1978	H	1265	S	Ooo/---
157	4031-7811	William Love	James R. Miller	1975	H	1060	S	Cgm/ls
158	4032-7820	The Cheeze Shoppe	Fred O. Albright	1977	H	1118	S	OSkt/---
159	4032-7820	T. Madigan	Harold E. Ritchey	1978	H	1195	S	Sbm/---
160	4034-7822	J. Manbeck	do.	1978	H	1145	S	Dbh/---
161	4035-7821	G. Garman	Roy F. Keefer	1979	H	1165	S	Dbh/---
162	4035-7821	D. McCaulley	James R. Miller	1979	H	1160	S	Obh/---
163	4041-7815	T. Hostler	do.	1979	H	1200	S	Olh/---
164	4042-7815	C. Golden	do.	1979	H	1440	S	Ock/---
165	4042-7814	Oillin	Oavid R. Erickson	1979	U	1445	S	Dck/---
166	4040-7816	Oebra Romano	Harold E. Ritchey	1978	H	1065	S	Dbh/---
167	4041-7814	J. Lego	James R. Miller	1978	H	1260	S	Obh/---
168	4042-7815	Hoy	Harold E. Ritchey	1978	H	1440	S	Ock/sh
170	4027-7822	8arry Ickes	Fred O. Albright	1975	H	1420	S	Sc/---
171	4027-7821	Or. William Saad	do.	1979	H	1310	S	Sc/---
172	4027-7821	N. S. Kerns	do.	1979	H	1290	S	Sc/---
173	4027-7822	Ronald Shuler	do.	1978	H	1320	S	Sc/---
174	4027-7822	Giller	do.	1980	H	1300	S	Sc/---
175	4028-7820	E. Crist	do.	1979	H	1105	S	DSkt/---
176	4034-7824	Cherry	Harold E. Ritchey	1978	H	1690	S	Ock/ss
177	4034-7824	S. Graham	do.	1979	H	1720	S	Dck/sh
178	4031-7826	R. Kuntz	do.	1977	H	1620	S	Dck/ss
179	4034-7824	Gerald Phelan	do.	1975	H	1650	S	Dck/ss
180	4028-7826	8ernard Black	William R. Parks, Jr.	1977	H	1160	V	Obh/---
181	4028-7826	J. Eberhardt	do.	1978	H	1120	V	Dbh/---
182	4027-7826	R. W. McKinney	Melvin R. Sensebaugh	1976	H	1260	S	Obh/sh
183	4027-7826	C. LeCrone	William R. Parks, Jr.	1978	H	1460	S	Os/---
184	4027-7827	Clair LeCrone	do.	1977	H	1440	S	Os/---
185	4027-7826	Nicholas Lynch	Fred D. Albright	1976	H	1240	S	Obh/---
186	4027-7826	L. 8aird	William R. Parks, Jr.	1978	H	1260	S	Ds/---
187	4027-7826	R. Brubaker	do.	1979	H	1180	S	Obh/---
188	4027-7826	do.	do.	1979	H	1140	S	Obh/---
189	4027-7826	do.	do.	1979	H	1140	S	Dbh/---
190	4027-7826	R. Forgas	James R. Miller	1978	H	1120	S	Dbh/sh
191	4027-7827	C. Helsel	William R. Parks, Jr.	1975	H	1240	S	Of/---
192	4027-7828	do.	do.	1975	H	1260	S	Of/---
193	4027-7828	Howard Clark	Fred O. Albright	1977	H	1760	S	Dck/ss
194	4027-7829	C. Aikens	do.	1978	H	1670	S	Dck/ss
195	4027-7829	J. Wilt	William R. Parks, Jr.	1978	H	1760	S	Ock/ss
196	4027-7825	G. Hiergeist	James R. Miller	1978	H	1040	V	Dh/sh
197	4027-7826	Charles Ray	Fred O. Albright	1977	H	1160	S	Obh/---
198	4026-7828	T. L. Stacey	James R. Miller	1975	H	1400	S	Df/---
199	4025-7827	Curry Excavating	William R. Parks, Jr.	1979	C	1220	V	Obh/---
200	4025-7826	Luther Wilt	Fred O. Albright	1977	H	1120	V	Obh/---
201	4022-7825	Paul 8enson	Harold E. Ritchey	1978	H	1005	V	Dmh/---
203	4022-7825	T. Flaugh	William R. Parks, Jr.	1979	H	990	V	Omh/---
204	4021-7825	S. Helsel	Harold E. Ritchey	1978	H	1010	V	Dmh/---
205	4022-7825	T. Lloyd	William R. Parks, Jr.	1979	H	990	V	Omh/---
206	4021-7826	Carl Hazenstab	Melvin R. Sensebaugh	1975	H	1185	S	Dbh/sh
207	4020-7826	J. Strayer	James R. Miller	1979	H	1170	S	Obh/sh
208	4019-7827	R. Scott	William R. Parks, Jr.	1978	H	1250	V	Obh/---
209	4018-7827	L. Miller	Bradie Glass	1977	H	1140	V	Obh/---
210	4020-7828	Robert Leedy	William R. Parks, Jr.	1977	H	1680	S	Df/---
211	4020-7828	H. Musselman	Harold E. Ritchey	1978	H	1575	S	Of/ss
212	4018-7826	Pat Hooper	8radie Glass	1975	H	1090	V	Omh/---
213	4017-7827	8. Clinich	William R. Parks, Jr.	1978	H	1150	V	Omh/---
214	4018-7827	Leonard Tompson	do.	1976	C	1125	V	Dmh/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
55	---	6	---	8	8/73	---	1.3	---	---	---	8a-122
85	---	6	---	36	8/73	---	1.2	---	---	---	123
90	---	6	---	28	8/73	---	.08	---	---	---	125
170	---	6	---	20	8/73	3	.04	---	---	---	126
76	---	6	---	8	8/73	7	.25	---	---	---	127
90	---	6	---	7	9/73	3	.07	---	---	---	128
238	150	6	---	7	8/73	13	.12	---	---	---	129
200	40	6	---	14	8/73	4	.05	---	---	---	130
50	26	6	---	8	8/73	6	.35	---	---	---	131
70	---	6	---	39	10/73	9	.86	---	---	---	132
72	---	6	---	32	10/73	4	.25	---	---	---	133
88	25	6	---	12	9/73	7	.20	---	---	---	135
66	21	6	---	36	9/73	3	.32	---	---	---	136
75	---	6	---	6	9/73	1	.05	---	---	---	137
90	---	6	---	10	9/73	10	.28	---	---	---	138
94	---	6	---	51	9/73	1	.08	---	---	---	139
85	---	6	---	31	9/73	42	1.9	---	---	---	142
60	---	6	---	16	5/73	100	100	---	---	---	143
130	50	6	---	48	9/73	18	.51	---	---	---	144
27	30	6	---	17	9/73	1	.04	---	---	---	145
107	---	6	---	11	10/73	22	.51	---	---	---	146
110	---	6	---	71	9/73	10	.70	---	---	---	147
212	192	4	---	---	8/75	---	---	---	---	---	148
240	220	4	180	200	4/78	7	---	---	---	---	149
223	---	---	---	---	7/76	1	---	15	509	---	150
185	130	6	150;185	---	10/75	18	---	14	545	---	151
37	21	6	---	---	4/79	20	---	---	---	---	152
160	30	6	159	---	6/78	40	---	24	1050	---	153
252	60	6	240	164	6/80	10	---	16	640	---	154
300	72	6	265	65	6/80	4	---	17	717	---	155
225	72	6	200	---	7/78	10	---	---	---	---	156
345	52	6	145	---	10/75	1	---	---	---	---	157
90	50	6	80;85	---	6/77	15	---	---	---	---	158
145	21	6	130	---	5/78	5	---	---	---	---	159
90	26	6	86	---	11/78	6	---	---	---	---	160
92	21	8	25;50;80	25	10/79	7	.18	---	---	---	161
370	20	6	265;310	---	6/79	2	---	5	355	---	162
217	21	6	80;190	---	10/79	2	---	---	---	---	163
185	22	6	87;165	62	6/80	5	---	11	420	---	164
190	71	6	145;165	67	6/80	5	---	---	---	---	165
72	21	6	68	---	7/78	10	---	---	---	---	166
215	20	6	175	56	6/80	2	---	6	472	---	167
135	20	6	125	---	6/78	10	---	---	---	---	168
210	23	6	150;200	113	6/80	5	---	---	---	---	170
225	36	6	150;190;210	49	6/80	10	---	---	---	---	171
220	42	6	150;180;210	25	6/80	10	---	4	180	---	172
310	35	6	305	45	6/80	12	---	---	---	---	173
300	31	6	80;265;290	97	6/80	16	---	---	---	---	174
140	81	6	90;110;135	59	6/80	10	---	17	827	---	175
270	21	6	240	---	10/78	3	---	---	---	---	176
300	21	6	240	---	2/79	3	---	---	---	---	177
132	25	6	115	15	8/77	7	---	11	510	---	178
455	23	6	---	---	5/75	10	---	9	460	---	179
90	---	---	---	9	5/77	10	.16	5	237	---	180
105	24	6	45;86;98	7	4/78	5	.05	---	---	---	181
200	21	6	85	40	6/76	1	.01	---	---	---	182
180	33	6	96;165	78	5/78	2	.02	5	390	---	183
200	30	6	125;190	78	9/77	2	.02	7	365	---	184
120	27	6	120	16	10/76	12	---	4	240	---	185
90	24	6	30;52;80	11	2/78	3	---	---	---	---	186
105	22	6	45;98	30	6/79	10	.18	---	---	---	187
33	30	6	32	15	6/79	5	.5	---	---	---	188
45	45	6	45	14	6/79	10	.43	---	---	---	189
473	22	6	125;457	---	4/78	0	---	---	---	---	190
80	20	6	30;62;78	7	11/75	---	---	6	325	---	191
40	24	6	---	---	7/75	8	.26	---	---	---	192
240	36	6	190;225	---	8/77	5	---	---	---	---	193
190	35	6	150;185	---	7/78	10	---	---	---	---	194
280	78	6	116;206	195	10/78	3	.05	---	---	---	195
181	72	6	50;120	---	9/78	2	---	8	450	---	196
170	21	6	130;165	---	6/77	12	---	---	---	---	197
245	21	6	105;200	---	8/75	3	---	3	140	---	198
45	32	6	40	15	4/79	15	1.5	---	---	---	199
260	26	6	---	10	1/77	20	---	1	710	---	200
72	20	6	63	---	6/78	10	---	---	---	---	201
45	21	6	36;42	7	6/80	15	.75	19	805	---	203
43	18	6	34	15	7/78	20	---	9	405	---	204
46	22	6	34;45	8	6/80	12	.48	---	---	---	205
43	32	6	40	13	6/80	25	---	7	355	---	206
217	18	6	120;235	---	7/79	3	---	---	---	---	207
60	19	6	30;56	4	8/78	10	.28	---	---	---	208
80	32	6	46;65	12	4/77	3	.04	---	---	---	209
110	32	6	70;90;106	5	8/77	20	.57	---	---	---	210
125	29	6	110	---	8/78	7	---	---	---	---	211
48	21	6	10;30;45	25	5/75	40	4.0	8	380	---	212
105	61	6	65;85	11	10/78	0	---	8	425	---	213
90	38	6	55;76;84	11	2/76	12	.20	---	---	---	214

TABLE 1

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer litholo
Number	Lat-Long							
Ba-215	4017-7828	Charles Hileman	Harold E. Ritchey	1975	H	1205	S	Dmh/---
216	4017-7827	M. Ake	William R. Parks, Jr.	1979	H	1180	V	Dbh/---
217	4016-7828	Alan Finnegan	Fred D. Albright	---	H	1190	V	Doo/---
218	4019-7823	Paris	Delbert and Joseph Schwab	1975	H	1295	S	Ons/ls
219	4017-7824	D. Ormsby, Jr.	Gerald W. Clark	1979	H	1430	S	Ons/---
220	4017-7823	P. Snowberger	do.	1978	H	1380	F	Ons/ls
221	4018-7824	R. J. Wakefield	do.	1979	H	1330	S	Ons/ls
222	4018-7825	W. H. Mock	do.	1979	H	1315	S	Ons/---
223	4019-7822	B. Mock	James R. Miller	---	H	1390	H	Oba/ls
224	4019-7821	Raymond Snyder	do.	1975	H	1360	S	Or/---
225	4019-7818	G. Kensinger	do.	1978	H	1510	S	Cgm/---
226	4025-7826	Joseph Wilt	William R. Parks, Jr.	1976	P	1120	V	Dh/ss
227	4024-7829	P. Smith	do.	1978	H	1540	S	Dck/ss
228	4024-7829	W. Rose	do.	1978	H	1340	V	Df/---
229	4023-7829	D. Hazenstab	do.	1978	H	6004	S	Df/---
230	4024-7827	Thomas Miller	do.	1977	H	1260	H	Dbh/---
231	4026-7826	Ansley & Lewis Inc.	James R. Miller	1978	N	1080	V	Dh/sh
232	4026-7826	W. S. Lee	Harold E. Ritchey	1979	C	1040	V	Dh/---
233	4022-7829	G. Aurandt	William R. Parks, Jr.	1979	N	1230	V	Df/---
234	4022-7829	Ronald Hoover	Melvin R. Sensebaugh	1976	H	1210	V	Df/sh
235	4022-7828	R. Egen	Harold E. Ritchey	1978	H	1210	V	Df/---
236	4022-7829	J. Lanzendorfer	William R. Parks, Jr.	1978	H	1210	V	Df/ss
237	4023-7827	D. Hazenstab	do.	1978	H	1080	V	Dmh/---
238	4023-7827	R. Ritchey	do.	1979	H	1080	V	Dbh/---
239	4023-7826	Richard Roorabaugh	James R. Miller	1976	H	1160	S	Dbh/sh
240	4023-7826	Thomas Mattas	do.	1975	H	1160	S	Dbh/---
241	4023-7826	D. Smychynsky	William R. Parks, Jr.	1979	H	1080	V	Dbh/---
242	4023-7826	T. L. Gibbon	Melvin R. Sensebaugh	1975	H	1080	S	Dbh/---
244	4023-7825	L. Ickes	James R. Miller	1979	H	1080	S	Doo/ls
245	4023-7823	Doris Miller	Delbert and Joseph Schwab	1978	H	1060	S	Doo/---
246	4026-7825	John Yardis	William R. Parks, Jr.	1977	H	1080	S	Doo/---
247	4023-7826	Lavern Gabella	do.	1975	H	1080	V	Dbh/---
248	4018-7817	C. Walter	James R. Miller	1979	H	1335	S	Ons/ls
249	4019-7817	Randy McGraw	do.	1977	H	1445	S	Ons/---
250	4019-7817	Gary Speck	Gerald W. Clark	1975	H	1350	S	Ons/ls
251	4017-7819	D. L. Legg	do.	1977	H	1495	S	Ons/ls
252	4017-7819	L. W. Jones	do.	1976	H	1475	S	Ons/ls
253	4015-7819	Harry Miller	do.	1977	H	1470	F	Oba/ls
254	4015-7818	E. Bridenbaugh	James R. Miller	1977	H	1470	S	Cgm/ls
255	4016-7818	R. Smouse	do.	1979	H	1425	S	Cwb/ls
256	4018-7817	J. Byler	do.	1978	H	1385	S	Oba/ls
257	4020-7819	David Dunn	Gerald W. Clark	1973	H	1475	S	Or/sh
258	4019-7820	L. Blattenberger	James R. Miller	1977	H	1570	S	Or/sh
259	4018-7821	P. Glunt	do.	1978	H	1485	S	Oba/ls
260	4018-7822	W. Decker	do.	1978	H	1415	F	Oba/ls
261	4019-7822	G. Dennis	do.	1978	H	1420	F	Oba/ls
262	4021-7830	D. Wronski	do.	1979	H	1990	S	Dck/ss
263	4021-7833	Charles Salyards	Harold E. Ritchey	1975	H	2345	S	Dck/ss
264	4022-7834	Daryl Black	Melvin R. Sensebaugh	1976	H	2305	S	Dck/sh
265	4020-7833	Rick Ritchey	William R. Parks, Jr.	1976	H	2340	H	Dck/---
266	4020-7833	J. Jackson	Harold E. Ritchey	1978	H	2345	H	Dck/sh
267	4021-7832	D. Long	do.	1978	H	2200	S	Dck/---
268	4020-7833	Ray Berkheimer	Melvin R. Sensebaugh	1976	H	2440	S	Dck/sh
269	4020-7822	Glenn Glass	James R. Miller	1975	H	1275	S	Oba/ls
270	4019-7823	J. Oestefan	Fred D. Albright	1978	H	1420	S	Oba/ls
271	4017-7822	Gerald Pasta	do.	1977	H	1455	F	Ons/---
272	4018-7823	Donald Imes	Gerald W. Clark	1977	H	1320	F	Ons/ls
273	4037-7819	Robert Riling	James R. Miller	1970	H	1090	S	Dbh/sh
274	4039-7818	Ralph Cherry	do.	1977	H	1190	S	Dlh/sh
275	4044-7811	Robert Husband	do.	1973	H	1175	V	Dlh/---
276	4027-7820	D. Kerr	Fred D. Albright	1979	H	1100	S	DSkt/---
277	4027-7820	Brian Steak	do.	1979	H	1078	S	DSkt/---
278	4026-7820	C. White	do.	1978	H	980	S	Doo/---
279	4027-7820	T. Burkholder	James R. Miller	1978	H	1010	S	Doo/---
280	4026-7819	George Miller	Melvin R. Sensebaugh	1975	H	965	H	Dbh/---
281	4026-7819	Dixie Barroner	James R. Miller	1975	H	918	V	Dbh/---
282	4026-7819	William Werts	do.	1975	H	930	S	Dbh/---
283	4026-7819	D. Creuzberger	Melvin R. Sensebaugh	1975	H	945	S	Dbh/---
284	4024-7819	David Burke	Fred D. Albright	1976	H	1220	S	St/---
285	4024-7818	P. Good	James R. Miller	1979	H	1295	S	Swc/---
286	4025-7816	F. Saltsgiver	do.	1979	H	1290	S	Or/---
287	4024-7816	J. Beck	do.	1979	H	1180	S	Ocl/---
288	4023-7816	M. Stultz	do.	1978	H	1190	S	Ons/---
289	4028-7816	Canoe Creek State Park	Harrisburg's Kohl Bros.	1968	P	900	S	Dh/---
290	4028-7816	do.	do.	1975	P	910	V	Dh/---
291	4029-7816	do.	Eichelberger Well Drilling, Inc.	1978	P	935	S	Dh/---
292	4041-7816	Barbara Conway	Harold E. Ritchey	1974	H	1230	S	Dck/---
293	4040-7815	William Mallory	James R. Miller	1977	H	935	S	Dh/---
294	4039-7817	B. Hunninger	Melvin R. Sensebaugh	1972	H	1080	S	Dbh/---
295	4026-7813	J. Verbonitz	James R. Miller	1978	H	1180	S	Cw/---
296	4026-7813	J. Traxler	do.	1979	H	1253	S	Ons/---
297	4029-7811	F. England	do.	1979	H	938	S	Ons/---
298	4029-7810	Louis Heller	do.	1976	H	985	S	Oba/---
299	4027-7811	W. England	do.	1979	H	1065	S	Ons/---

(CONTINUED)

Total depth below land surface (feet)	Casing Depth (feet)	Casing Diameter (inches)	Depth(s) to water-bearing zone(s) (feet)	Static water level Depth below land surface (feet)	Static water level Date measured (mo/yr)	Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
230	23	6	---	---	7/75	3	---	---	---	---	Ba-215
60	22	6	45;57	12	6/79	5	.13	5	215	---	216
100	37	6	100	2	---	15	---	---	---	---	217
97	27	6	86	27	6/80	10	---	10	650	---	218
220	187	6	197	160	8/79	15	.75	---	---	---	219
162	93	6	141;158	100	11/78	15	.5	---	---	---	220
326	54	6	200;280;315	80	8/79	15	.07	---	---	---	221
264	20	6	58;223;264	100	10/79	6	.06	---	---	---	222
182	102	5	137;150	121	6/80	9	---	20	605	---	223
130	22	6	60;125	---	9/75	4	---	---	---	---	224
468	61	6	390;415;430	---	5/78	5	---	---	---	---	225
56	22	6	24;52	5	6/76	6	.14	---	---	---	226
260	42	6	175;250	150	6/78	8	.26	---	---	---	227
55	26	6	48	30	7/78	10	1.0	---	---	---	228
200	---	6	104;140;190	68	5/78	51	.04	---	---	---	229
140	35	6	45;70;120	32	9/77	4	.04	9	470	---	230
270	22	6	110;190;245	---	5/78	15	---	---	---	---	231
280	40	6	140;200	194	6/80	6	---	5	340	---	232
60	21	6	54	5	6/80	20	---	5	380	---	233
60	21	6	28;56	12	10/76	9	0.3	---	---	---	234
58	22	6	50	---	8/78	20	---	---	---	---	235
80	20	6	26;48;60	6	6/78	5	.08	5	320	---	236
90	25	6	30;70	18	6/80	3	.05	---	---	---	237
80	29	6	60;74	20	7/79	10	.29	---	---	---	238
200	20	6	45	42	6/80	2	---	---	---	---	239
495	31	6	145	---	8/75	1	---	---	---	---	240
115	36	6	62	21	4/79	1	.01	---	---	---	241
150	20	6	45;146	17	6/80	6	.05	---	---	---	242
85	38	6	55;80	---	9/79	12	---	---	---	---	244
250	21	6	80;185	---	11/78	2	---	---	---	---	245
75	75	6	75	58	3/77	8	1.3	13	520	---	246
120	24	6	60;80;115	9	7/75	4	.03	---	---	---	247
145	60	6	135	59	6/80	8	---	---	---	---	248
205	173	6	190;203	---	7/77	25	---	---	---	---	249
261	66	6	142;235;250; 258	100	7/75	15	---	---	---	---	250
152	---	6	133	120	3/77	8	---	---	---	---	251
261	107	6	122;230	100	3/76	6	---	---	---	---	252
123	19	6	113	83	3/77	6	.3	---	---	---	253
285	175	6	240;275	170	6/80	60	---	8	305	---	254
125	39	6	98	---	7/79	9	---	---	---	---	255
181	84	6	160	85	6/80	10	---	16	650	---	256
70	34	6	31;40;50; 55	15	3/73	15	---	4	160	---	257
110	21	6	70;95	---	12/77	13	---	---	---	---	258
325	28	6	163	95	6/80	1	---	18	860	---	259
156	70	6	75;151	---	4/78	90	---	---	---	---	260
195	45	6	145;190	---	11/78	60	---	---	---	---	261
140	22	6	80;130	---	3/79	8	---	---	---	---	262
205	35	6	---	57	6/80	10	---	5	165	---	263
60	25	6	54	26	6/80	20	1.0	2	58	---	264
130	109	6	120;128	69	6/80	5	.08	4	175	7.4	265
125	42	6	110	---	12/78	8	---	---	---	---	266
260	21	6	240	---	8/78	6	---	---	---	---	267
195	22	6	145;180	155	6/80	5	.12	5	190	---	268
105	22	6	85;97	---	10/75	40	---	---	---	---	269
360	46	6	350	119	7/80	15	---	17	605	---	270
160	26	6	120;140	110	4/77	60	---	---	---	---	271
143	116	6	120;126;130	91	7/80	12	.40	---	---	---	272
212	20	6	40;190	---	7/70	4	---	---	---	---	273
250	20	6	35	---	7/77	3	---	5	200	---	274
70	21	6	40	---	11/73	6	---	---	---	---	275
160	20	6	140;150	57	6/80	12	---	17	---	---	276
180	21	6	170	36	6/80	10	---	18	---	---	277
150	23	6	145	3	6/80	12	---	10	470	---	278
221	21	6	125	---	11/78	2	---	---	---	---	279
50	24	6	30;44	24	6/80	20	1.4	9	485	---	280
85	27	6	40;65	---	7/75	12	---	16	1100	---	281
70	20	6	40	30	6/80	12	---	4	260	---	282
47	22	6	45	8	8/75	12	1.0	---	---	---	283
245	148	6	180;240	175	10/76	12	---	---	---	---	284
290	130	6	170;278	56	6/80	4	---	8	345	---	285
381	19	6	125;350	34	6/80	1	---	4	247	---	286
385	21	6	152	---	3/79	2	---	---	---	---	287
105	21	6	65;90;103	---	6/78	100	---	---	---	---	288
300	42	6	55;270	6	10/68	51	.78	5	452	---	289
300	50	6	10;200	9	6/80	3	.02	---	---	---	290
375	81	6	99;106;207	39	6/80	80	---	11	410	---	291
210	47	6	---	---	6/74	---	---	---	---	---	292
300	21	6	50	14	7/80	1	---	6	515	---	293
55	30	6	34;50	15	6/72	8	---	---	---	---	294
232	23	6	210	---	3/78	---	---	7	230	---	295
262	234	6	250	184	7/80	10	---	---	195	---	296
247	57	6	222;230	---	10/79	25	---	12	427	7.1	297
500	21	6	105;215;433	---	5/76	8	---	18	605	7.3	298
340	20	6	85;197;325	---	3/79	55	---	18	655	---	299

TABLE 16

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ litholog
Number	Lat-Long							
8a-300	4028-7810	Gary Crownover	James R. Miller	1978	H	840	S	Ocl/---
301	4023-7826	G. Brumbaugh	Melvin R. Sensebaugh	1976	H	1240	S	Dbh/sh
302	4023-7827	J. Koontz	Harold E. Ritchey	1977	H	1100	V	Dbh/---
303	4023-7827	K. Smith	Fred D. Albright	1979	H	1160	S	Obh/---
304	4023-7826	T. Smith	William R. Parks, Jr.	1979	H	1160	S	Dh/---
305	4024-7823	H. Johnson	Fred D. Albright	1979	H	990	V	Doo/---
306	4026-7825	Bem	Harold E. Ritchey	1979	H	1030	V	Doo/---
307	4026-7828	L. Snowberger	Fred O. Albright	1979	H	1310	S	Ds/---
308	4032-7826	A. Ingham	do.	1980	H	1650	S	Dck/---
309	4032-7826	J. Ratzesberger	do.	1979	H	1740	S	Dck/sh
310	4034-7827	Tom Conrad	Paul Rossi	1976	H	2480	H	Mmc/sh
311	4034-7824	Tom Kies	Fred D. Albright	1977	H	1630	S	Dck/---
312	4034-7822	R. Frederick	do.	1979	H	1210	S	Dbh/---
313	4035-7824	Richard Nelson	William R. Parks, Jr.	1976	H	1440	S	Dck/ss
314	4030-7827	T. Stultz	Fred D. Albright	1979	H	1740	S	Dck/ss
315	4032-7826	G. Reid	do.	1978	H	1760	S	Dck/ss
316	4032-7826	Jim Bodnar	George A. Lynch, Jr.	1977	H	1790	S	Dck/---
317	4032-7826	James Trexler	Fred O. Albright	1973	H	1720	S	Dck/sh
318	4037-7822	McCormick	Donald W. Graham	1976	H	1480	S	Dck/---
319	4037-7822	C. Arnsparger	William R. Parks, Jr.	1976	H	1310	V	Dck/---
320	4032-7823	Phil Pearchy	Fred D. Albright	1978	H	1300	S	Dbh/---
321	4033-7822	John Skelly	James R. Miller	1976	H	1160	S	Dbh/sh
322	4033-7823	J. Chilcote	do.	1979	H	1210	V	Dbh/sh
323	4034-7823	Bob Sipes	Harold E. Ritchey	1975	H	1210	S	Dbh/---
324	4034-7823	S. Crider	James R. Miller	1978	H	1210	S	Dlh/sh
325	4032-7825	Philip Jarrett	Fred D. Albright	1972	H	1360	S	Dlh/---
326	4029-7824	City of Altoona	Moody Drilling Co., Inc.	1967	U	1144	V	Doo/---
327	4029-7824	do.	do.	1968	U	1148	V	Doo/---
328	4029-7824	do.	do.	1968	U	1145	V	Doo/---
329	4018-7818	Martinsburg Bor.	do.	1967	U	1448	F	Cgm/---
330	4018-7818	do.	do.	1967	P	1448	F	Cgm/---
331	4018-7819	do.	---	1937	P	1440	S	Ons/---
332	4018-7819	do.	---	1945	P	1418	S	Ons/---
333	4018-7820	do.	---	1937	P	1360	S	Ocl/---
334	4020-7821	do.	---	1928	U	1590	W	Or/---
335	4019-7821	do.	---	---	U	1570	S	Or/---
336	4019-7820	do.	---	---	U	1375	V	Or/---
337	4019-7820	do.	---	1940	U	1360	V	Or/---
338	4016-7820	Curryville Water Authority	---	---	P	1450	S	Ons/---
339	4016-7820	do.	---	1968	P	1425	H	Ons/---
340	4026-7825	Duncansville Bor.	Moody Drilling Co., Inc.	1967	P	980	V	DSkt/---
341	4025-7825	do.	---	1967	U	970	V	DSkt/---
342	4016-7827	General Refractories Co.-Sproul	---	1946	P	1185	V	Doo/---
343	4016-7827	do.	---	1964	P	1200	V	Doo/---
344	4027-7812	Williamsburg Munic. Authority	Moody Drilling Co., Inc.	1969	P	1055	W	Cgm/---
345	4027-7812	do.	do.	1969	P	1070	W	Cgm/---
346	4017-7826	General Refractories Co.-Claysburg	---	---	P	1145	V	Doo/---
348	4034-7823	K. Wilson	Harold E. Ritchey	1977	H	1360	S	Dlh/---
349	4034-7823	D. Oswald	do.	1977	H	1340	S	Dbh/---
350	4036-7822	D. Mills	James R. Miller	1978	H	1400	S	Dck/ss
351	4032-7824	David Swanger	do.	1970	H	1440	S	Dlh/sh
352	4031-7826	K. Johnson	George A. Lynch, Jr.	1977	H	1680	S	Dlh/---
353	4031-7826	Paul Hollern	William R. Parks, Jr.	1970	H	1710	S	Dlh/---
354	4030-7825	N. Lafferty	Melvin R. Sensebaugh	1971	H	1230	V	Dlh/sh
355	4031-7826	Cory Pellas	Fred D. Albright	---	H	1640	S	Dck/sh
359	4026-7811	Stanley and Fred England	James R. Miller	1976	S	1141	S	Ons/---
360	4026-7811	Williamsburg Bible Baptist Ch.	do.	1979	T	1090	S	Oba/---
361	4026-7810	R. Keene	do.	1979	H	1090	S	Ocl/---
362	4024-7813	Eli Smith	do.	1978	H	1140	S	Cgm/---
363	4023-7814	Raymond Caruso	do.	1976	H	1218	S	Cgm/ls
364	4025-7811	K. Bush	do.	1979	H	1128	H	Oba/---
370	4043-7811	C. McClellan	do.	1976	H	1010	V	Dmh/sh
371	4042-7813	Fred Snyder	do.	1973	H	1095	V	Dmh/sh
372	4042-7814	David Miller	William R. Parks, Jr.	1975	H	1115	S	Dbh/---
373	4042-7814	Jerry Deluca	do.	1975	H	1160	S	Dbh/---
374	4042-7812	Tim Jackson	James R. Miller	1976	H	1040	S	Dmh/ss
375	4041-7813	Charles Hostler	---	1974	H	1010	S	Dmh/---
376	4042-7814	Robert Anders	William R. Parks, Jr.	1975	H	1185	S	Dbh/---
377	4026-7825	Small Tube Products	Moody and Associates, Inc.	1979	I	982	V	DSkt/---
378	4026-7825	do.	do.	1979	I	982	V	DSkt/---
								CENTRE
Ce- 12	4049-7759	P. C. and O. J. Shivery	Elliot	1916	H	1720	S	Oj/sh
94	4042-7756	The Pa. State University	---	1961	H	1226	V	Ocl/ls
118	4045-7757	U. S. Geol. Survey	Russell R. Brooks	1967	U	1150	V	Cg/dol
119	4046-7757	Pa. Game Comm.	Moody Drilling Co., Inc.	1970	R	1215	V	Cg/dol
132	4045-7754	Kenneth Bennet	Harrisburg's Kohl Bros.	1960	H	1225	V	Cgm/dol
133	4049-7757	Centre Association Inc.	L. E. Gladfelter	1958	P	1320	V	Obf/ls
141	4047-7756	Pa. Game Comm.	---	1894	U	1360	S	Cg/dol
142	4047-7756	do.	---	1894	U	1351	S	Cg/dol
153	4047-7756	State College Bor.	Layne-New York Co., Inc.	1963	U	1341	S	Cg/dol

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
160	22	6	30;35;60	---	9/78	9	---	10	370	---	Ba-300
200	16	6	85;130	40	4/76	2	.17	6	340	---	301
210	21	6	60	30	7/77	1	---	---	---	---	302
200	44	6	---	---	10/79	---	---	6	390	---	303
200	22	6	80;115;132	43	3/79	7	.05	---	---	---	304
165	27	6	40;100;155	---	8/79	10	---	---	---	---	305
55	21	6	40	---	1/79	10	---	---	---	---	306
280	21	6	80;250;260	---	9/79	3	---	---	---	---	307
225	54	6	150;190;220	---	1/80	5	---	4	300	---	308
260	42	6	180;220;250	---	9/79	5	---	3	280	---	309
94	40	6	46;72;84	---	6/76	24	---	1	50	---	310
330	30	6	200;325	---	10/77	2	---	2	170	---	311
120	24	6	100;110	---	9/79	10	---	---	---	---	312
70	40	6	50;66	26	5/76	4	.10	2	100	---	313
300	23	6	190;250;285	---	9/79	4	---	---	---	---	314
350	34	6	---	---	5/78	5	---	2	320	---	315
273	40	6	96;256	---	10/77	12	---	---	---	---	316
187	36	6	84;182	---	8/73	12	---	5	270	---	317
63	26	6	35;60	30	7/80	10	.67	2	70	---	318
150	130	5	141	25	5/76	5	.04	---	---	---	319
240	21	6	35;250	15	11/78	2	---	---	---	---	320
110	20	6	50;100	---	9/76	7	---	5	220	---	321
163	22	6	50;80	10	7/80	3	---	---	---	---	322
178	42	6	---	52	7/80	3	---	4	220	---	323
98	22	6	78	---	9/78	8	---	---	---	---	324
80	26	6	40;75	18	8/72	12	---	3	210	---	325
549	81	12	---	45	12/67	1350	45	---	---	---	326
625	101	12	---	55	1/68	250	8.3	---	---	---	327
545	88	12	---	45	1/68	1400	46	---	---	---	328
296	223	6	140	98	5/67	230	10	---	---	---	329
350	145	6	162	94	3/67	230	13	---	---	---	330
456	---	8	---	---	---	12	---	---	---	---	331
100	---	10	---	---	---	20	---	---	---	---	332
378	---	8	---	---	---	21	---	---	---	---	333
177	---	8	---	---	---	---	---	---	---	---	334
199	---	8	---	---	---	---	---	---	---	---	335
200	---	8	---	---	---	---	---	---	---	---	336
200	30	8	---	---	---	---	---	---	---	---	337
396	---	6	---	49	3/75	12	.04	---	---	---	338
223	45	6	---	---	---	150	---	---	---	---	339
341	79	8	---	0	7/67	300	100	---	---	---	340
340	48	6	95	1	6/67	---	---	---	---	---	341
154	---	8	---	---	---	100	---	---	---	---	342
216	75	8	---	---	---	200	---	---	---	---	343
487	116	8	---	210	---	300	7.1	---	---	---	344
417	264	8	---	219	---	300	30	---	---	---	345
65	---	8	---	---	---	80	---	---	---	---	346
275	21	6	100	40	8/77	2	---	---	---	---	348
335	21	6	---	61	7/80	1	---	4	440	---	349
181	22	6	170	---	9/78	6	---	---	---	---	350
107	20	6	80	50	7/80	---	---	5	220	---	351
140	20	6	122;131	49	7/80	12	---	8	260	---	352
293	40	6	135;235;285	95	9/70	3	.01	---	---	---	353
75	42	6	38;61;70	12	10/71	1	.14	---	---	---	354
225	35	6	220	40	---	12	---	12	470	---	355
400	66	6	68;175;300	---	9/76	12	---	22	743	---	359
217	20	6	95;200	---	8/79	10	---	23	813	---	360
400	111	6	350;390	---	10/79	3	---	9	335	7.2	361
125	47	6	98	---	6/78	18	---	14	467	7.3	362
215	211	6	190;212	---	5/76	90	---	5	165	---	363
303	44	6	180;285	---	5/79	5	---	---	---	---	364
70	37	6	40	---	10/76	18	---	---	---	---	370
62	21	6	37	---	2/73	2	---	---	---	---	371
70	22	6	30;56	10	10/75	3	---	---	---	---	372
50	24	6	35;45	11	7/75	6	.18	---	---	---	373
110	101	6	60;105	---	3/76	36	---	---	---	---	374
105	84	6	85	---	9/74	20	---	---	---	---	375
68	44	6	48;67	15	10/75	10	.33	---	---	---	376
218	52	10	---	4	5/79	575	96	---	---	---	377
217	46	10	---	4	5/79	675	225	---	---	---	378
COUNTY											
110	23	6	---	+1	---	45	4.5	---	---	---	Ce- 12
200	135	6	---	150	1961	25	.14	---	---	---	94
130	40	6	---	82	1/67	---	110	17	725	---	118
506	179	8	---	152	4/70	510	146	4	---	8.0	119
250	40	6	---	78	10/60	310	9.4	---	---	---	132
219	37	6	105;205	105	---	6	---	---	---	7.3	133
368	---	8	---	340	---	1000	---	---	---	---	141
366	284	10	---	322	---	140	79	---	---	---	142
458	361	12	---	349	---	---	---	---	---	---	153

TABLE 16.

Well location: Number	Well location: Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/lithology
Ce-154	4047-7756	State College Bor.	Layne-New York Co., Inc.	1964	U	1351	S	Cg/dol
155	4047-7756	do.	Harrisburg's Kohl Bros.	1967	U	1360	S	Cg/dol
156	4047-7757	do.	do.	1966	U	1308	V	Cg/dol
157	4047-7757	do.	do.	1967	U	1333	V	Cg/dol
179	4043-7754	Cedar Hills Water Co.	Oscar Dearmit	1966	P	1390	S	Or/ls
180	4043-7754	do.	do.	1966	P	1285	S	Ocl/ls
189	4047-7756	Pa. Game Comm.	---	1894	U	1350	S	Cg/dol
205	4046-7755	L. W. Nixon	Harrisburg's Kohl Bros.	1966	I	1215	V	On/dol
210	4047-7801	Upper Halfmoon Water Co.	Oscar Oearmit	1976	P	1430	S	Or/sh
211	4047-7801	do.	---	1964	P	1415	S	Or/sh
212	4047-7846	do.	---	---	U	1310	V	Obf/dol
213	4044-7757	Rockspring Water Co.	Gilbert R. Zechman	1967	P	1120	V	Cg/dol
214	4043-7753	Ferguson Twp. Water Authority	---	1967	P	1460	V	Obe/ss
215	4043-7753	do.	8rooks & Kline	1967	P	1460	V	Obe/ss
216	4043-7753	do.	do.	1967	P	1480	V	Obe/ss
217	4043-7753	do.	---	---	U	1420	V	Or/sh
235	4043-7759	E. Johnstonbaugh	Oscar Dearmit	1979	H	1125	S	Cg/ls
236	4044-7801	Fred Herman	do.	1977	H	1220	S	Cg/ss
237	4044-7800	D. Dolbin	do.	1980	H	1305	S	Cgm/ss
238	4044-7801	M. Frysinger	do.	1976	H	1205	S	Osl/ls
239	4044-7800	Countryside Nursery	do.	1977	H	1245	S	Osl/ls
240	4044-7800	do.	do.	1979	H	1245	S	Osl/ls
241	4044-7759	D. Moore	do.	1978	H	1290	U	Cgm/---
310	4045-7807	Mary Gee	do.	1976	H	1150	V	Olh/sh
322	4044-7801	B. Hamilton	do.	1978	H	1180	S	Cg/ls
								FULTON
Fu- 87	4003-7757	Lester Widel	Mr. Powell	---	H	840	S	Sbm/---
88	4003-7757	---	---	---	T	---	S	Swc/---
93	4003-7809	Pa. Dept. of Environmental Resources	Joseph Epley	1965	U	1150	V	Mp/---
126	4005-7810	R. Wright	do.	1978	H	1380	S	Mmc/---
127	4005-7810	V. Wright	do.	1979	H	1390	S	Mmc/sh
128	4005-7807	G. Mellott	Charles Springer	1979	H	1130	S	Mmc/sh
129	4006-7808	8. Sweger	do.	1978	H	1080	S	Mmc/---
130	4001-7810	J. Travers	Joseph Epley	1979	H	1710	S	Mp/---
131	4000-7810	S. Kuralowicz	do.	1977	H	1450	S	Mp/---
132	4000-7810	John Wheeler	do.	1977	H	1520	S	Mp/---
133	4000-7810	J. Crevoiserat	do.	1978	H	1420	S	Mp/sh
134	4000-7810	C. J. Cooke	do.	1978	H	1520	S	Mp/---
135	4001-7811	Claire Christ	do.	1977	H	1560	S	Mp/---
136	4001-7810	G. Hunt	do.	1978	H	1805	S	Mp/ss
137	3958-7812	D. Barber	do.	1978	H	1230	H	Mmc/sh
138	3958-7812	Richard Hixson	do.	1977	H	1200	V	Mp/---
139	4000-7810	Howard Elmore	do.	1976	H	1380	S	Mp/---
140	3957-7813	R. Fischer	do.	1979	H	1250	S	Mmc/---
141	3956-7813	P. Johnson	do.	1978	C	1160	V	Mmc/---
151	4002-7801	H. Berkstresser	do.	1979	H	1145	S	Dck/sh
152	4002-7802	J. Clark	do.	1980	H	1140	H	Dck/---
153	4004-7803	R. G. Barnett	do.	1979	H	1200	H	Dck/---
162	3958-7756	R. Stawsbaugh	Larry G. Walters	1979	H	1325	S	Sbm/---
164	4007-7803	T. Newman	Charles Springer	1978	H	840	S	Dciv/sh
165	4006-7759	W. Hess	do.	1978	H	980	S	Of/sh
166	4004-7758	Cecil Fraker	---	1979	H	965	S	DSkt/---
167	4005-7759	Wayne Fleming	Charles Springer	1975	H	1080	S	Df/---
168	4003-7757	W. Peck	do.	1978	H	778	S	Sc/---
169	4007-7801	H. Taylor	Joseph Epley	1978	H	860	H	Dciv/sh
170	4005-7759	R. Henry	Charles Springer	1978	H	1035	H	Ds/---
171	4005-7757	A. Cromwell	Larry G. Walters	1977	H	780	S	OSkt/ls
172	4002-7757	B. Parson	do.	1979	H	860	V	Dh/---
173	4004-7803	G. Miller	do.	1978	H	980	S	Ock/sh
174	4004-7754	Ernest Ooney	Charles Springer	1978	H	945	S	Dh/---
175	4002-7757	Belvy Shoop	Larry G. Walters	1977	H	860	V	Dh/---
178	4005-7807	Wells Valley Ch.	do.	1979	T	1130	S	Mmc/sh
179	4001-7758	Oonald Strait	Joseph Epley	1976	H	1055	S	Ociv/---
186	4000-7806	S. Gordon	Charles Springer	1980	H	1120	H	Dck/sh
187	4002-7800	8. Parsons	Larry G. Walters	1979	H	1100	H	Obh/sh
188	4007-7803	N. Foor	do.	1979	H	860	S	Ock/sh
								HUNTINGDON
Hu- 1	4021-7808	H. G. Stauffer	---	---	U	720	V	Df/---
6	4029-7800	Clifton Theatre	Artesian Well Drilling Co.	---	A	630	V	Dh/sh
7	4029-7801	Supplee-Wills-Jones Milk Co.	L. Stell	---	N	600	V	Oh/---
8	4029-7803	D. A. Olds	G. Nox	1921	H	1020	S	Doo/ls
9	4036-7803	Petersburg Water Comm.	---	1960	P	870	W	Sc/---
12	4026-7806	H. Shaffer	Kegg	---	H	780	S	Swc/ls
33	4040-7811	G. Guyer	Sprague & Henwood, Inc.	1931	H	1000	V	Oba/ls
34	4040-7812	Tyrone Lime and Stone Co.	Willi m Houser	1933	N	970	V	Oba/ls
47	4034-7807	Stowe-Fuller Refractories Co.	---	1933	N	740	V	Sc/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
453	286	8	---	362	---	350	136	---	---	---	Ce-154
450	297	10	---	404	---	7	.13	---	---	---	155
500	359	10	340;362	350	---	725	192	---	---	---	156
505	434	16	379;400	369	1/68	495	24	---	---	---	157
185	22	6	19;103;175	40	11/66	10	.07	---	---	---	179
248	22	6	145;185;212	52	---	50	---	---	---	---	180
429	---	6	---	329	---	146	---	---	---	8.3	189
325	217	6	---	111	9/66	56	1.3	---	---	---	205
220	20	6	24;30;54;75	17	9/76	32	.51	---	---	---	210
165	28	8	---	11	11/64	42	.37	---	---	---	211
83	60	6	---	---	---	---	---	---	---	---	212
322	60	6	---	25	1967	100	10	---	---	---	213
29	23	6	---	13	---	10	---	---	---	---	214
75	30	6	35;68	7	5/67	15	.24	1	---	6.0	215
75	42	6	48;69	5	5/67	25	1.2	1	---	6.3	216
350	---	6	---	30	2/68	0	---	---	---	---	217
85	70	6	75	---	7/79	30	---	---	---	---	235
185	65	6	180	---	3/77	12	---	---	---	---	236
321	318	6	311	---	1/80	12	---	---	---	---	237
125	100	6	120	7	7/80	10	---	8	290	7.70	238
180	155	6	175	119	7/80	20	---	8	385	---	239
210	174	6	205	116	7/80	40	---	10	420	7.75	240
270	195	6	255	---	9/78	10	---	---	---	---	241
60	20	6	60	19	10/80	8	---	4	215	8.2	310
65	53	6	60	---	12/78	10	---	---	---	---	322
COUNTY											
66	12	6	---	34	---	---	---	---	---	---	Fu- 87
183	20	6	---	35	---	7	---	---	---	---	88
191	45	6	---	300	7/65	18	.30	17	250	---	93
325	24	6	132	100	10/78	2	.06	5	205	---	126
360	22	6	200;328	100	5/79	3	.01	6	215	---	127
280	40	6	190;275	40	8/79	30	.75	---	---	---	128
60	40	6	55	40	7/78	60	---	---	---	---	129
163	20	6	70;108;144	70	4/79	15	.13	---	---	---	130
128	21	6	98;113	30	10/77	15	.09	---	---	---	131
178	26	6	---	20	1977	2	---	1	95	---	132
100	24	6	71;78;94; 100	8	9/80	100	1.8	4	215	7.5	133
102	20	6	60;80;90	24	9/80	20	.35	2	60	7.8	134
80	32	6	---	8	9/80	12	.18	---	---	---	135
223	27	6	139;195;205	100	11/78	5	.05	---	---	---	136
360	21	6	42	30	6/78	3	.01	---	---	---	137
283	21	6	100;260	25	7/77	12	.04	---	---	---	138
123	34	6	70;104;110	20	4/76	40	.39	4	115	---	139
260	33	6	237	25	9/80	8	.08	4	200	7.7	140
120	39	6	34;105	25	9/78	33	.94	---	---	---	141
162	74	6	80;100;138	30	2/79	15	.3	---	---	---	151
292	---	---	223;242	100	3/80	15	.12	---	---	---	152
244	20	6	150;221	68	9/80	20	.13	6	245	---	153
140	70	6	85;130	20	6/79	15	---	---	---	---	162
100	42	6	60;90	10	11/78	15	.75	5	180	---	164
200	40	6	180;195	30	7/78	15	0.3	---	---	---	165
250	---	---	---	105	9/80	---	---	18	550	---	166
45	21	6	40	8	4/75	15	---	---	---	---	167
180	---	6	180	40	7/78	6	.06	5	165	---	168
122	22	6	70;98;115	40	8/78	15	.22	---	---	---	169
125	40	6	120	77	9/80	30	.75	3	130	7.4	170
104	34	6	85	40	9/80	15	---	8	250	---	171
103	40	6	60;95	20	11/79	20	---	---	---	---	172
145	34	6	60;135	19	9/80	30	---	---	---	---	173
99	95	6	99	50	9/80	20	---	5	280	---	174
205	20	6	80;195	F	9/80	25	---	5	192	---	175
238	20	6	125;218	20	12/79	5	---	---	---	---	178
163	21	6	93;130	113	9/80	6	.08	5	185	---	179
160	42	6	80;150	30	5/80	18	.60	---	---	---	186
206	42	6	78;197	45	3/79	20	---	---	---	---	187
149	47	6	95;128	25	7/79	10	---	---	---	---	188
COUNTY											
33	---	6	---	25	10/61	---	---	---	---	---	Hu- 1
197	---	6	---	1	---	90	22	---	---	---	6
186	---	8	---	8	---	300	---	---	---	---	7
94	45	6	---	65	---	5	---	---	---	---	8
163	41	8	---	0	---	40	.7	---	---	---	9
31	10	6	---	3	---	12	---	---	---	---	12
99	8	6	---	17	10/31	4	---	---	---	---	33
50	42	6	---	---	---	250	---	---	---	---	34
206	---	6	---	40	9/33	17	---	---	---	---	47

TABLE 16

Well location: Number	Well location: Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/litholog
Hu- 51	4029-7800	Benson Bros. Ice Cream Co.	Clifford Mansfield	1933	A	660	V	Dh/sh
54	4026-7757	Wright's Farm Market	Hoover	---	H	620	V	Ock/ss
57	4017-7752	Charles Terizzy	---	---	H	600	S	Dm/sh
66	4023-7752	Mt. Union Ice Co.	Artesian Well Drilling Co.	---	C	580	V	Swc/sh
79	4014-7754	East Broad Top R.R. & Coal Co.	R. R. Hornberger	1933	H	750	S	Oh/---
96	4031-7759	Edgar Lindsay	Kohl Bros., Inc.	1933	H	780	S	Oon/ss
98	4029-7801	Boyle Ice Co.	Clifford Mansfield	1933	N	620	V	Oh/ls
99	4029-7801	Steel Ice Co.	---	1883	N	640	V	Oh/---
102	4010-7806	Rockhill Coal & Iron Co.	Muirhead	1916	D	1800	S	Mmc/---
107	4030-7808	Alexandria Water Co.	---	---	---	1010	W	Sbm/---
108	4030-7808	do.	---	---	---	1042	W	Sbm/---
115	4018-7807	Commonwealth of Pa.	F. L. Bollinger & Sons	1962	T	1040	S	Mp/ss
116	4017-7743	Mrs. Mowry	R. Galen Martin	1978	H	735	V	Dmh/---
117	4017-7743	O. Robertson	Theodore F. Rothrock	1978	H	740	V	Dmh/---
118	4017-7744	M. Plank	Larry G. Walters	1979	H	1015	S	Dtr/sh
119	4036-7807	P. L. Blair	---	1974	H	778	V	Ons/---
120	4033-7810	Clapper Farm Equipment	James R. Miller	1978	H	1060	H	Cg/---
121	4037-7807	Jerry Woodring	do.	1973	H	845	V	Cg/---
122	4037-7807	R. Brown	do.	1979	H	820	S	Ons/---
123	4034-7808	Christ Lutheran Ch.	Donald W. Graham	1978	T	880	V	Oba/---
124	4033-7810	Clapper Farm Equipment	James R. Miller	1978	H	1060	S	Cg/---
125	4037-7807	L. Sottile	do.	1979	H	785	V	Oba/---
126	4036-7807	Ernest Anderson	do.	1974	H	890	S	Ons/---
127	4036-7808	Jerome Wilson	Oscar Dearmit	1970	H	810	V	Ons/---
128	4036-7808	H. Espy	do.	1978	H	765	S	Oba/---
129	4023-7810	B. Garner	David R. Eriksen	1979	N	1080	S	Sbm/---
130	4024-7809	C. Bush	Martin W. Shatzer	1978	H	945	S	Sbm/---
131	4026-7808	T. L. Fox	James R. Miller	1975	H	985	S	Sc/ss
132	4021-7810	Bryce Saylor	do.	1975	H	1120	S	Obh/---
133	4021-7811	W. McCavitt	Martin W. Shatzer	1979	H	1020	S	Swc/sh
134	4019-7812	George Forshey	James R. Miller	1972	H	918	S	Oh/---
135	4020-7810	Richard Inett	do.	1972	H	990	S	Obh/---
136	4018-7808	William Burk	Glenn E. Houp	1979	H	1100	S	Mp/ss
137	4017-7807	C. Rhoads, Jr.	---	1975	H	1100	S	Mmc/---
138	4016-7808	Jim Kling	Donald W. Graham	1975	H	1400	S	Mmc/---
139	4016-7810	Robert Gates	do.	1975	H	1255	S	Mp/---
140	4015-7811	J. Hess	do.	1978	---	1435	S	Mmc/---
141	4016-7811	U. S. Army Corps of Engineers	Gerald W. Clark	1978	P	795	V	Dck/---
142	4018-7810	do.	do.	1978	P	810	S	Ock/---
143	4017-7813	Howard Giles	Glenn E. Houp	1979	U	840	S	Dh/---
144	4016-7814	H. F. Higgins	Gerald W. Clark	1973	H	1040	S	Dbh/---
145	4013-7812	Bible Deliverance Center Ch.	James R. Miller	1978	P	980	V	Mmc/sh
146	4013-7813	C. Black	Donald W. Graham	1978	H	863	V	Dck/---
147	4012-7811	J. Chamberlain	Gerald W. Clark	1973	H	1095	V	Mmc/---
148	4018-7814	Martin Low	Glenn E. Houp	1978	H	980	S	Swc/---
149	4014-7813	U. S. Army Corps of Engineers	Gerald W. Clark	1978	P	790	S	Df/---
150	4012-7810	J. Morgan	David R. Eriksen	1979	H	1570	S	Pa/---
151	4028-7801	R. Wetherite	Martin W. Shatzer	1979	H	910	S	Dbh/sh
152	4027-7801	S. Grove	Donald W. Graham	1979	H	995	S	Obh/ls
153	4028-7801	W. Welsh	Martin W. Shatzer	1978	H	1000	S	Obh/sh
154	4027-7801	B. Kelly	do.	1978	H	1040	H	Dbh/sh
155	4027-7802	Fred Grove	do.	1979	H	1050	S	Dbh/sh
156	4027-7802	R. Eckley	do.	1979	H	1140	S	Dbh/sh
157	4028-7803	M. Muller	do.	1979	H	705	V	Dh/sh
158	4027-7805	H. Bupp	do.	1978	H	700	V	DSkt/ls
159	4026-7806	M. Henry	James R. Miller	1978	H	800	S	DSkt/ls
160	4027-7804	C. Rowe	David R. Eriksen	1979	H	720	S	Dh/ls
161	4027-7803	V. Miller	James R. Miller	1979	H	720	V	Dh/sh
162	4027-7805	Wilma Gallagher	---	1977	H	750	S	Oop/ss
163	4029-7801	R. Cunningham	David R. Eriksen	1979	H	760	S	Dh/sh
164	4026-7802	A. Toth	James R. Miller	1978	H	1060	H	Dbh/sh
165	4024-7856	S. Steel	Martin W. Shatzer	1979	H	640	V	Dbh/sh
166	4028-7801	John Grove	James R. Miller	1973	H	1020	S	Dbh/sh
167	4028-7801	E. Leffard	Donald W. Graham	1978	H	1020	S	Dbh/---
168	4020-7801	D. Kyler	Larry G. Walters	1978	H	1160	V	Mmc/---
169	4020-7800	T. Heims	do.	1978	H	1220	V	Mmc/sh
170	4019-7802	R. Pollock	do.	1978	H	1240	V	Mmc/ss
171	4019-7802	D. Wright	Glenn E. Houp	1977	H	1305	S	Mmc/---
172	4017-7802	B. Brown	Martin W. Shatzer	1978	H	1295	S	Mmc/sh
173	4028-7801	Thomas Royer	do.	1980	H	1110	S	Dbh/sh
174	4027-7804	Trinity United Ch. of Christ	James R. Miller	1979	T	710	V	Oh/sh
175	4029-7803	M. Christy	Martin W. Shatzer	1979	H	975	S	Dop/ss
176	4020-7811	R. Fouse	Glenn E. Houp	1977	H	880	S	Dh/---
177	4015-7813	Carl Pryer	Donald J. Fisher	1976	H	1290	S	Os/---
178	4015-7813	Eric Martin	do.	1976	H	1325	S	Os/---
179	4015-7814	Robert Collins	do.	---	H	1320	S	Os/---
180	4017-7813	W. Collins	Glen E. Houp	1977	H	885	S	Dbh/---
181	4021-7811	Clapper	Martin W. Shatzer	1979	H	935	S	DSkt/ls
182	4021-7810	Rightenour Enterprises	James R. Miller	1979	H	870	V	Dh/sh
183	4021-7830	R. Greenleaf	do.	1978	H	1120	S	Dbh/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
136	---	4	---	7	9/33	30	---	---	---	---	Hu- 51
150	23	6	---	20	---	5	---	---	---	---	54
55	37	6	---	1	---	40	---	---	---	---	57
106	38	6	---	8	---	80	13	---	---	---	66
465	33	6	---	35	11/33	35	---	---	---	---	79
120	35	6	---	75	9/33	7	---	---	---	---	96
184	---	8	---	---	9/33	120	6	---	---	---	98
385	---	8	---	30	---	40	2	---	---	---	99
293	293	6	---	---	---	---	---	---	---	---	102
173	45	6	---	---	---	150	---	---	---	---	107
124	30	6	---	---	---	75	---	---	---	---	108
300	40	8	---	---	5/62	55	.82	---	---	---	115
71	21	6	---	6	5/80	30	---	8	285	---	116
96	22	6	---	---	8/78	12	---	4	200	---	117
238	40	6	120;230	---	11/79	6	---	---	---	---	118
45	20	6	25;30	9	6/80	40	---	10	---	---	119
247	54	6	85;175	42	6/80	4	---	9	422	---	120
130	110	6	115;120	---	9/73	30	---	12	440	---	121
45	22	6	24	12	6/80	70	---	---	---	---	122
45	19	6	40	3	6/80	30	---	14	560	---	123
407	21	6	150	---	10/78	1	---	---	---	---	124
60	42	6	---	4	6/80	10	---	---	---	---	125
185	67	6	142	---	10/74	---	---	---	---	---	126
82	64	6	80	---	11/70	30	---	---	---	---	127
45	20	6	40	---	1/78	20	---	---	---	---	128
100	21	6	50;80	25	8/79	7	---	10	345	---	129
82	40	6	---	10	8/78	60	3.0	17	578	7.1	130
125	21	6	85;110	---	6/75	20	---	---	---	---	131
405	20	6	85	---	4/75	2	---	8	285	---	132
142	41	6	100;135	20	4/79	20	0.5	---	---	---	133
70	20	6	30;60	---	10/72	15	---	---	---	---	134
335	300	5	80;290	80	12/72	2	---	8	307	6.3	135
160	39	6	70;140	25	6/79	6	---	---	---	---	136
60	20	6	20	45	12/75	1	---	---	---	---	137
165	35	6	80;160	99	7/80	7	.17	7	255	6.28	138
45	40	6	42	5	8/75	7	.23	2	90	---	139
60	62	6	20;40	25	2/78	10	0.5	2	53	---	140
162	21	6	50;120;155	28	9/78	7	.06	2	75	---	141
150	22	6	50;92	20	9/78	4	.06	4	50	6.02	142
320	42	6	90;205;275	35	6/79	4	---	11	533	---	143
183	21	6	50	50	9/73	3	---	5	260	6.8	144
90	20	6	50;76;83	---	3/78	40	---	8	325	---	145
100	20	6	60;80	5	7/78	20	---	9	330	5.49	146
63	29	6	6;20;50	---	8/73	---	---	7	225	---	147
105	28	6	48;88	49	9/78	11	---	15	480	---	148
140	47	6	40;75;128	27	9/78	8	.08	12	375	7.30	149
95	22	6	45;80	30	3/79	6	---	---	---	---	150
200	42	6	95;195	48	7/80	18	.26	4	140	---	151
355	20	6	45;340	173	7/80	3	---	4	210	---	152
180	63	6	85;170	111	7/80	30	.60	4	210	---	153
400	42	6	280	106	7/80	3	.02	5	270	---	154
280	42	6	165;280	113	7/80	12	.17	5	225	---	155
300	38	6	190;285	141	7/80	12	.15	6	245	---	156
45	21	6	35	6	6/79	40	6.7	---	---	---	157
45	31	6	35;40	9	7/80	15	1.2	---	---	---	158
165	127	6	130	---	7/78	6	---	---	---	---	159
175	21	6	50;125	20	11/79	3	---	7	280	---	160
200	20	6	120	---	6/79	2	---	---	---	---	161
168	168	6	163	---	8/77	25	---	7	305	---	162
200	21	6	180	---	1/79	4	---	14	595	---	163
283	22	6	120;275	92	7/80	15	---	---	---	---	164
100	50	6	60;95	20	6/79	40	4.0	---	---	---	165
383	20	6	70;310	---	3/73	4	---	5	245	---	166
290	25	6	200;280	30	3/78	6	---	---	---	---	167
105	21	6	45;90	13	7/80	25	---	8	350	---	168
210	36	6	110;200	14	7/80	25	---	---	---	---	169
285	26	6	65;140	2	7/80	3	---	---	---	---	170
115	34	6	60;88	55	7/77	12	---	2	105	---	171
182	63	6	165	47	7/80	6	.08	---	---	---	172
260	42	6	240	60	7/80	12	0.1	5	195	---	173
63	21	6	40;49	---	11/79	18	---	---	---	---	174
280	63	6	270	140	3/79	15	.37	---	---	---	175
105	22	6	40;78;95	6	12/77	9	.24	---	---	---	176
135	24	6	35;80	14	6/80	4	---	4	115	---	177
100	24	6	40	15	6/76	3	---	---	---	---	178
62	20	6	40	8	---	20	---	---	---	---	179
92	28	6	38;55;80	38	11/77	9	.23	---	---	---	180
90	72	6	70;85	---	5/79	20	---	---	---	---	181
185	20	6	85;135	---	6/79	4	---	---	---	---	182
386	20	6	285	---	6/78	3	---	---	---	---	183

TABLE 16.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Hu-184	4033-7758	Clyde Lane	James R. Miller	1975	H	810	S	Dop/ss
185	4034-7753	Dale Sandt	do.	1978	H	750	S	Dmh/sh
186	4034-7753	J. Pierolli	do.	1978	H	790	S	Dmh/sh
187	4034-7753	Griffin	do.	1978	H	765	S	Dmh/sh
188	4034-7753	T. Gustafson	do.	1978	H	740	S	Dmh/sh
189	4034-7756	Don Hollabaugh	do.	1975	H	840	S	Don/ss
190	4030-7758	Lee Crile	Donald W. Graham	---	H	1140	H	Dbh/---
191	4031-7759	Ronald Gore	James R. Miller	1972	H	740	S	Don/ss
192	4031-7759	H. Wakefield	Glenn E. Houp	1977	H	695	S	Dmh/---
193	4031-7759	R. 8argiel	Martin W. Shatzer	1978	H	790	S	Dmh/sh
194	4033-7757	8. Lidston	James R. Miller	1979	H	725	S	Don/ss
195	4037-7755	Margaret Lightner	do.	1976	H	1000	S	Sbm/sh
196	4037-7754	R. Peters	do.	1979	H	1105	S	Sc/sh
197	4031-7752	P. Hickes	do.	1978	H	880	S	Dbh/sh
198	4037-7756	J. Claar	do.	1978	H	870	S	Swc/sh
199	4037-7758	Edward Ewing	do.	1975	H	735	S	Sbm/---
200	4040-7804	Roy Wheland	do.	1975	H	1135	S	Osl/ls
201	4027-7802	Pen Mar Development	Donald W. Graham	1978	P	1140	H	Dbh/ls
202	4027-7802	do.	do.	1979	P	1140	S	Dbh/ls
203	4027-7802	do.	do.	1979	P	1160	H	Dbh/ls
204	4027-7754	Raymond Crownover	William R. Parks, Jr.	1973	H	1040	V	DSkt/---
205	4028-7755	R. Carson	Martin W. Shatzer	1979	H	1180	S	Df/sh
206	4035-7750	R. Kessler	James R. Miller	1978	H	810	S	Dh/sh
207	4020-7753	J. Gumbert	Martin W. Shatzer	1979	H	800	V	Dh/sh
208	4018-7801	R. Mirley	do.	1978	H	1160	V	Mmc/sh
209	4019-7801	Michael Mansberger	Glenn E. Houp	1979	H	1190	V	Mmc/ss
210	4018-7802	Dale Horton	do.	1979	H	1190	V	Mmc/---
211	4021-7801	Martha Roland	do.	1979	H	1220	S	Mmc/ss
212	4020-7801	C. David	Fisher's Well Drilling	1979	H	1180	S	Mmc/ss
213	4017-7804	W. Lefever	Martin W. Shatzer	1979	H	1300	S	Mp/ss
214	4017-7804	L. Harshman	do.	1979	H	1305	S	Mp/ss
215	4017-7804	T. Barnhart	do.	1979	H	1290	H	Mp/ss
216	4019-7801	D. Lutz	do.	1978	H	1285	H	Mp/---
217	4015-7806	Todd Twp.	Larry G. Walters	1980	P	1360	S	Mmc/sh
218	4015-7806	8. Myers	do.	1978	H	1280	V	Mmc/sh
219	4015-7800	E. Yohn	do.	1978	H	960	S	Dbh/---
220	4016-7759	D. L. Smith	do.	1978	H	1110	V	Dh/sh
221	4016-7800	T. Zirobile	Donald W. Graham	1978	H	1260	S	Dck/---
222	4019-7759	Robert Worthy	Leroy H. Hoffer	1970	H	880	V	Dbh/---
223	4034-7751	B. Kreidler	James R. Miller	1978	H	700	V	Dh/sh
224	4035-7752	J. Jackson	Martin W. Shatzer	1978	H	720	V	Dh/---
225	4027-7758	Paul Mondo	James R. Miller	1974	H	600	V	Dck/---
226	4012-7805	A. Bolinger	R. Galen Martin	1978	H	1558	V	Mmc/sh
227	4012-7805	Miles Brenna	Gerald W. Clark	1972	H	1578	V	Mmc/---
228	4012-7805	Guy Territo	Martin W. Shatzer	1975	H	1545	S	Mmc/sh
229	4013-7802	H. Miller	Larry G. Walters	1979	H	995	S	Dck/---
230	4011-7803	Pa. Game Comm.	Gerald W. Clark	1978	P	1117	S	Mmc/---
231	4013-7805	Thomas Runk	Glenn E. Houp	1975	H	1560	S	Mmc/---
232	4010-7802	E. 8urnett	Larry G. Walters	1977	H	1040	V	Dck/---
233	4009-7800	E. Kough	do.	1978	H	1010	H	Dbh/---
234	4010-7800	H. Greenland	Martin W. Shatzer	1978	H	1045	S	Dh/---
235	4010-7800	8. Heffelfinger	do.	1979	H	1090	S	Dh/---
236	4008-7802	C. Cramer	do.	1978	H	935	V	Ds/---
237	4012-7800	Saltillo Water Co.	do.	1977	P	885	S	Sbm/---
238	4013-7801	D. Watkins	Evan W. Grissinger	1978	H	825	V	Dh/---
239	4013-7801	D. Thomas	Martin W. Shatzer	1979	H	830	V	Dh/---
240	4013-7802	Richard Hamilton	do.	1974	H	1065	H	Dck/---
241	4014-7800	M. Fleming	Larry G. Walters	1978	H	965	V	Dbh/---
242	4006-7759	J. Rourke	R. Galen Martin	1977	H	1010	S	Dck/---
243	4007-7757	H. McCoy	Larry G. Walters	1978	H	720	V	Dbh/---
244	4007-7756	D. Long	do.	1978	H	920	S	Dh/---
245	4041-7810	P. Maceno	Oscar Dearmit	1977	H	1130	S	Cg/---
246	4041-7809	W. Nearhoff	do.	1978	H	1305	H	Cg/---
247	4041-7809	R. Lutz	do.	1978	H	1305	H	Cg/---
248	4041-7808	H. Lear	do.	1978	H	1265	S	Cg/---
249	4042-7809	G. Nearhoff	do.	1978	H	1575	S	Oj/---
250	4038-7808	E. Newlin	James R. Miller	1978	H	990	S	Cg/---
251	4014-7753	Orbisonia-Rock Hill Joint Authority	Robert N. Eriksen	1973	P	640	V	Doo/---
253	4012-7759	Three Springs Bor.	---	1963	U	890	S	Sbm/---
254	4036-7803	Petersburg Water Comm.	---	1966	---	865	W	Sc/---
255	4039-7811	8irmingham Water Works	---	---	U	1040	S	Cg/---
256	4042-7808	Warriors Mark Water Co.	Oscar Dearmit	1965	P	1380	W	Or/---
257	4017-7752	Shirleysburg Munic. Authority	Robert N. Eriksen	1968	P	670	S	Doo/ls
260	4012-7807	Broad Top City Water Authority	Harrisburg's Kohl 8ros.	1968	P	965	H	Pp/---
261	4037-7806	Harris Layton	Oscar Dearmit	1976	H	875	S	Ocl/sh
262	4040-7806	G. Lake	do.	1979	H	1020	S	Cph/ls
263	4043-7809	W. 8uck	do.	1979	H	1230	S	Ocl/ls
264	4032-7806	I. Clark	James R. Miller	1978	H	670	V	Sbm/sh
265	4033-7806	J. Tennis	Oscar Oearmit	1979	H	760	S	Sbm/sh
266	4032-7803	G. Phillips	Donald W. Graham	1978	H	940	S	Dop/ls
267	4031-7800	E. Hurley	Martin W. Shatzer	1978	H	830	S	Dop/ss
268	4030-7800	Fred Hess	James R. Miller	1974	H	810	S	Oop/ss

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
90	20	6	63;75	---	3/75	18	---	---	---	---	Hu-184
162	20	6	40;92;150	37	7/80	25	---	3	75	6.8	185
150	21	6	70;100	---	12/78	7	---	---	---	---	186
325	21	6	140;315	---	12/78	4	---	---	---	---	187
200	21	6	180	50	7/80	---	---	4	185	6.8	188
205	20	6	140;200	---	4/75	12	---	16	500	6.8	189
102	48	6	65;90	70	---	6	---	---	---	---	190
65	42	6	43;53	---	11/72	30	---	2	85	6.5	191
65	23	6	28;55	12	11/77	20	2.5	---	---	---	192
62	38	6	55	20	5/78	20	2.0	17	625	---	193
217	20	6	203;210	---	8/79	20	---	---	---	---	194
225	20	6	100;175;210	---	11/76	4	---	---	---	---	195
344	25	6	150;335	---	4/79	7	---	---	---	---	196
80	22	6	60	---	8/78	15	---	---	---	---	197
96	45	6	60;90	---	6/78	20	---	---	---	---	198
105	21	6	75;90	---	7/75	30	---	---	---	---	199
145	90	6	100;120	---	10/75	18	---	10	320	---	200
290	20	6	---	---	9/78	15	---	---	---	---	201
400	20	6	---	84	7/80	6	---	---	---	---	202
440	38	6	---	93	7/80	2	---	---	---	---	203
70	43	6	45;65	24	7/73	20	.77	---	---	---	204
320	63	6	180;310	64	7/80	10	.17	---	---	---	205
161	18	6	80;140	---	8/78	6	---	---	---	---	206
142	59	6	80;140	60	4/79	14	.35	---	---	---	207
102	44	6	60;95	18	7/80	12	.48	7	300	---	208
100	21	6	38;60;90	18	6/79	14	.16	8	375	---	209
100	21	6	40;80	---	6/79	15	---	---	---	---	210
115	21	6	55;105	68	7/80	60	---	---	---	---	211
121	63	6	96;101	---	11/79	12	---	---	---	---	212
335	61	6	320	58	7/80	4	.02	---	---	---	213
150	42	6	140	60	5/79	10	.17	---	---	---	214
220	41	6	120;210	69	7/80	15	.19	---	---	---	215
125	42	6	---	30	11/78	2	.10	---	---	---	216
178	40	6	110;165	92	7/80	18	---	6	250	---	217
205	41	6	115;190	---	7/78	10	---	---	---	---	218
125	50	6	75;120	20	4/78	12	---	---	---	---	219
105	30	6	50;100	8	4/78	15	---	2	125	---	220
160	20	6	146	54	7/80	5	---	1	50	---	221
50	35	6	---	---	6/70	14	---	4	150	---	222
58	19	6	40;45	---	5/78	20	---	---	---	---	223
200	42	6	60;105;180	F	7/80	20	1.0	11	210	7.25	224
65	31	6	33;55	---	9/74	10	---	---	---	---	225
96	20	6	---	---	7/78	20	---	---	---	---	226
123	26	6	40;80;90; 110	43	7/80	12	---	6	212	---	227
88	42	6	65;80	12	7/80	32	.15	---	---	---	228
100	23	6	70;90	6	7/80	20	---	---	---	---	229
202	36	6	40;93;172; 184	30	7/80	15	.09	7	275	7.08	230
105	21	6	65;95	25	7/75	16	---	7	270	---	231
124	---	---	60;120	F	7/80	30	---	6	220	---	232
165	36	6	110;155	40	9/78	10	---	---	---	---	233
120	42	---	55;110	31	7/80	15	.30	3	110	---	234
250	50	6	125;230	40	4/79	15	.21	5	175	---	235
150	40	6	140	F	7/80	32	2.6	7	233	---	236
305	92	6	140;260;290	90	11/77	50	1.6	---	---	---	237
83	29	6	70	5	7/80	28	2.8	6	233	---	238
140	75	6	85;135	10	7/80	15	.42	6	220	---	239
108	27	6	80;104	60	4/74	20	---	---	---	---	240
125	30	6	65;95	25	4/78	7	---	---	---	---	241
196	20	6	---	---	11/77	2	---	---	---	---	242
90	21	6	40;83	7	7/80	30	---	---	215	---	243
104	50	6	95	30	4/78	18	---	18	613	---	244
125	112	6	120	80	7/80	20	---	15	577	---	245
370	318	5	365	---	3/78	5	---	8	247	---	246
330	322	6	325	254	7/80	20	---	6	210	---	247
270	260	6	265	---	6/78	9	---	---	---	---	248
165	40	6	160	---	2/78	20	---	---	---	---	249
142	93	6	94;120	50	8/80	30	---	14	445	---	250
215	30	8	213	0	8/73	100	10	---	---	---	251
290	18	6	---	18	8/80	30	---	---	---	---	253
249	21	6	---	---	---	30	.13	---	---	---	254
145	39	---	---	40	---	8	---	---	---	---	255
435	23	6	45;140	1	7/65	20	.21	---	---	---	256
290	26	8	105;278	10	10/68	44	.37	---	---	---	257
280	33	8	---	8	8/68	85	.45	---	---	---	260
135	40	6	130	---	9/76	1	---	---	---	---	261
90	87	6	85	---	3/79	15	---	---	---	---	262
210	20	6	200	10	7/80	3	---	9	420	8.92	263
77	21	6	65	---	5/78	12	---	---	---	---	264
390	40	6	385	---	3/79	5	---	---	---	---	265
260	252	4	65;155;250	60	3/78	13	1.2	9	395	7.58	266
182	68	6	140;180	80	9/78	40	.5	---	---	---	267
163	120	5	---	76	7/80	9	---	4	150	---	268

TABLE 16.

Well location								
Number	Lat-Long	Owner	Oriller	Oate completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ lithology
Hu-269	4031-7800	F. Gump	Oonald W. Graham	1978	H	835	S	Dop/ss
270	4031-7800	J. Kerestan	Glenn E. Houp	1977	H	750	5	Oon/ss
271	4039-7804	W. Harpster	Oscar Oearmit	1978	H	1100	S	Obf/ls
272	4039-7804	do.	do.	1978	H	1100	5	Obf/ls
273	4037-7806	J. Young	do.	1979	H	830	V	Or/sh
274	4042-7800	8allfield	do.	1977	H	1165	H	Cg/ss
275	4042-7800	O. Campbell	do.	1979	H	1115	5	Osl/ls
276	4021-7753	William Copenhaver	Martin W. Shatzer	1978	H	725	V	Oh/sh
278	4014-7756	L. Grover	Larry G. Walters	1978	H	810	H	Dh/---
279	4011-7758	O. Whitsel	do.	1979	H	730	5	Obh/---
280	4010-7801	L. Hoffman	Martin W. Shatzer	1979	H	880	5	Obh/---
281	4012-7755	South Huntingdon County Sch.	Larry G. Walters	1978	I	650	V	Obh/sh
282	4012-7755	Rodger Winters	Martin W. Shatzer	1977	H	660	V	Olh/sh
283	4012-7756	Heritage 8aptist Ch.	Larry G. Walters	1977	T	760	V	Olh/sh
284	4013-7754	R. Wilson	Martin W. Shatzer	1978	H	650	V	Oh/---
285	4013-7754	O. Hearn	do.	1978	H	670	V	Oh/---
286	4013-7754	G. Hanncock	Larry G. Walters	1980	H	680	V	Dh/sh
287	4013-7754	K. Long	do.	1978	H	670	V	Oh/---
288	4009-7755	R. 8rown	do.	1978	H	820	S	Oh/sh
289	4007-7757	T. Ramsey	do.	1980	H	720	V	Dh/---
290	4007-7757	G. Locke	do.	1980	H	820	S	Dh/sh
291	4008-7758	T. Ramsey	do.	1978	H	820	V	Ock/sh
292	4008-7758	I. Locke	do.	1978	H	740	V	Dciv/sh
293	4012-7754	Jerry Sample	Martin W. Shatzer	1976	H	780	5	Oh/sh
294	4010-7756	O. Phalem	Larry G. Walters	1978	H	1020	S	Ociv/sh
295	4014-7753	H. Parson	do.	1978	H	670	S	O5kt/ls
296	4011-7752	O. Grove	do.	1979	H	835	S	Ocn/ls
297	4008-7753	E. Verner	do.	1978	H	1120	S	Oh/sh
298	4008-7753	S. Glunt	do.	1979	H	1095	V	Obh/sh
299	4008-7753	J. Lake	do.	1978	H	1120	S	Ooo/---
300	4032-7803	R. 8aker	Martin W. Shatzer	1979	H	1125	H	Oop/ls
301	4018-7807	U. S. Geol. Survey	Gerald W. Clark	1969	Z	970	5	Mp/ss
302	4033-7804	Church parsonage	Martin W. Shatzer	1978	H	725	5	Swc/ls
303	4033-7804	William Peters	Glenn E. Houp	1973	H	750	S	5wc/---
304	4037-7800	E. McGreary	James R. Miller	1979	H	760	5	5wc/sh
305	4035-7800	A. R. Kutz	do.	1979	H	750	V	5wc/sh
306	4035-7800	O. Kline	do.	1978	H	1160	5	5wc/sh
307	4033-7804	John Colbert	Leroy H. Hoffer	1975	H	670	V	5wc/---
308	4030-7804	Clair 8rindle	James R. Miller	1975	H	1035	5	OSkt/ls
309	4032-7806	Oaniel Oietz	do.	1974	H	760	V	5wc/---
310	4038-7749	8. Couch	Oavid R. Eriksen	1980	5	905	5	D5kt/ls
311	4039-7749	R. Lynch, Jr.	James R. Miller	1978	H	880	5	5c/sh
312	4038-7752	P. Ourner, Jr.	do.	1978	H	810	S	5c/sh
313	4038-7752	do.	do.	1978	H	775	5	Sbm/---
314	4040-7749	H. Z. Heritage Homes	do.	1979	H	1000	5	5c/ss
315	4039-7751	Charles Porter	Oscar Dearmit	1977	H	875	5	Sc/sh
316	4040-7749	Helen Moore	James R. Miller	1977	H	930	F	5wc/sh
317	4037-7752	Donald Gibbony	do.	1977	H	780	5	5bm/sh
318	4032-7758	A. Varner	Martin W. Shatzer	1979	H	745	5	Dmh/sh
319	4040-7754	Robert Horner	Norman John Kline, Jr.	1971	H	890	V	Sbm/sh
320	4037-7756	G. Ewing	James R. Miller	1978	H	765	5	5wc/sh
321	4037-7756	T. Vallance	do.	1979	H	810	5	5c/sh
322	4038-7757	Ralph Rudy	do.	1975	H	810	F	5wc/sh
323	4038-7757	Raymond Giles	do.	1975	H	860	5	5bm/---
324	4038-7757	Michael Miller	do.	1975	H	870	5	5bm/---
325	4010-7751	A. Cisney	Larry G. Walters	1979	H	1110	5	Dmh/sh
326	4010-7751	E. 8onnema	do.	1977	H	920	5	OSkt/---
327	4010-7750	C. Lake	do.	1979	H	980	5	Ociv/sh
328	4011-7751	D. Kappe	do.	1979	H	905	F	5wc/---
329	4012-7748	W. Kneebel	do.	1978	H	1090	V	Dciv/sh
330	4012-7748	Earl Parson	do.	1977	H	1150	S	Ociv/sh
331	4010-7748	R. Goshorn	do.	1977	H	1155	H	Dtr/sh
332	4008-7750	E. Reames	do.	1979	H	1100	5	Omh/sh
333	4007-7750	J. Cowan	do.	1978	H	1050	5	Doo/ss
334	4010-7749	Ed Goshorn	do.	1977	H	1155	5	Dtr/---
335	4018-7747	M. Cowan	Martin W. Shatzer	1979	H	820	V	Or/sh
336	4021-7744	R. Longwell	Larry G. Walters	1979	H	940	S	Or/---
337	4021-7748	C. Williams	James R. Miller	1979	H	580	5	Sc/sh
338	4020-7751	A. Crouse	Martin W. Shatzer	1979	H	600	5	O5kt/ls
339	4014-7751	R. Laird	Larry G. Walters	1979	H	740	5	Ocl/ls
340	4018-7752	J. 8iles	Oavid 8. Wood	1977	H	560	V	Dh/sh
341	4015-7745	J. Parson	Larry G. Walters	1979	H	900	S	Dtr/---
342	4012-7810	Oudley-8arnettstown Water Assoc.	---	1973	P	1538	V	Pp/---
								JUNIATA
Ju- 3	4036-7719	Mrs. Shirk	---	---	H	570	V	5bm/---
4	4038-7717	Frank Writter	---	---	H	650	5	5wc/---
5	4038-7717	Wilson 8enner	---	---	H	650	V	O5kt/ls
6	4038-7716	I. G. Headings	---	---	H	640	V	O5kt/sh
7	4038-7716	C. E. Kaufman	---	---	H	650	V	OSkt/ls
8	4038-7715	James Long	---	---	H	680	V	O5kt/---
13	4036-7719	J. 8. Wilson	Hubler Well Drilling Co.	1932	H	580	V	5bm/sh
14	4032-7728	Oavid Crawford	---	---	H	540	V	O5kt/ls
15	4030-7725	Ralph Gilson	---	---	H	520	H	Oop/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
140	140	4	120	120	2/78	8	.53	2	60	---	Hu-269
96	78	6	82	45	11/77	5	.11	---	---	---	270
370	43	6	365	83	7/80	8	---	---	---	---	271
310	72	6	305	16	7/80	2	---	---	---	---	272
31	24	6	21	---	9/79	12	---	---	---	---	273
244	144	---	239	134	7/80	7	---	8	220	---	274
125	52	6	115	33	7/80	100	---	8	350	---	275
99	40	6	70;90	25	8/78	40	1.6	---	---	---	276
346	36	6	315	110	11/78	2	---	8	210	---	278
170	40	6	105;160	9	7/80	15	---	---	---	---	279
102	42	6	70;95	30	9/79	20	.67	---	---	---	280
225	20	6	203	127	7/80	15	---	3	200	---	281
125	22	6	80;120	10	6/77	30	3.0	4	170	---	282
80	38	6	55;75	30	7/80	30	---	---	---	---	283
100	42	6	60;95	6	3/78	50	---	---	---	---	284
170	29	6	40;160	30	3/78	7	1.2	---	---	---	285
42	21	6	25;35	12	5/80	30	---	---	---	---	286
105	32	6	90	20	9/78	10	---	---	---	---	287
164	48	6	110;155	60	7/80	25	---	2	110	---	288
133	40	6	70;120	25	3/80	7	---	---	---	---	289
285	52	6	90;175;265	44	7/80	15	---	---	---	---	290
145	22	6	40;135	15	4/78	18	---	---	---	---	291
165	34	6	75;120;150	28	9/78	25	---	4	255	---	292
65	21	6	60	8	3/76	12	1.0	---	---	---	293
165	69	6	55;150	F	9/78	12	---	---	---	---	294
286	30	6	170;275	13	8/80	5	---	29	1000	---	295
224	40	6	105;215	30	7/79	10	---	---	---	---	296
155	46	6	90;143	36	8/80	10	---	---	---	---	297
208	42	6	115;202	50	4/79	18	---	---	---	---	298
170	70	6	125;170	49	8/80	25	---	---	---	---	299
460	105	6	---	---	2/79	15	.18	12	350	7.98	300
105	18	6	---	55	9/69	43	---	---	---	---	301
153	53	6	---	30	8/78	20	.28	---	---	---	302
150	66	6	44;95;120	70	10/73	25	.83	6	200	8.02	303
300	20	6	125;230	---	7/79	2	---	---	---	---	304
98	20	6	65;85	23	7/80	15	---	---	---	---	305
181	55	6	110;160	---	10/78	10	---	40	1500	7.41	306
60	20	6	30;45;50	30	7/75	8	---	15	495	---	307
325	52	6	115;275;315	---	1/75	6	---	---	---	---	308
105	23	6	40;95	7	7/80	4	---	18	575	8.25	309
225	51	6	110;205	50	1/80	9	---	11	420	7.55	310
170	21	6	108	---	9/78	3	---	---	---	---	311
325	20	6	140	27	7/80	1	---	---	---	---	312
100	40	6	92	32	7/80	8	---	9	325	7.39	313
160	22	6	75;125;145	---	4/79	6	---	---	---	---	314
165	27	6	160	64	7/80	10	---	9	275	---	315
70	---	6	30;55;63	---	2/77	20	---	---	---	---	316
95	51	6	56;72	---	7/77	36	---	---	---	---	317
100	42	6	60;95	5	7/80	12	.60	12	450	---	318
40	18	6	30;35	---	1971	30	---	---	---	---	319
202	19	6	40;120	47	7/80	2	---	11	545	7.47	320
78	20	6	63	---	5/79	50	---	---	---	---	321
105	20	6	45;100	---	1/75	9	---	---	---	---	322
105	21	6	45;75;95	---	7/75	40	---	---	---	---	323
125	21	6	50;120	53	7/80	36	---	14	460	7.21	324
133	28	6	70;125	---	11/79	25	---	---	---	---	325
185	32	6	60;178	86	7/80	10	---	10	340	---	326
117	41	6	85;110	20	7/80	12	---	2	315	---	327
72	38	6	44;65	10	4/79	25	---	---	---	---	328
105	30	6	50;95	6	8/80	15	---	---	---	---	329
205	40	6	75;180	---	5/77	20	---	---	---	---	330
165	32	6	125;155	26	8/80	6	---	4	165	---	331
284	46	6	175;240	33	8/80	4	---	4	200	---	332
105	65	6	90	40	9/78	10	---	---	---	---	333
166	34	6	80;160	---	5/77	20	---	---	---	---	334
120	33	6	80;115	6	3/79	50	5.0	5	230	---	335
177	53	6	90;170	7	9/80	15	---	2	320	---	336
190	21	6	70;165;185	---	4/79	50	---	---	---	---	337
180	81	6	180	30	7/79	25	0.8	8	480	---	338
103	40	6	60;90	30	9/80	20	---	---	---	---	339
71	---	6	---	---	10/77	---	---	---	---	---	340
133	20	6	70;120	20	11/79	20	---	---	---	---	341
170	27	8	---	45	3/73	255	17	---	---	---	342
COUNTY											
50	10	6	---	30	---	1	---	---	---	---	Ju- 3
92	16	6	---	36	---	3	---	---	---	---	4
52	16	6	---	18	---	3	---	---	---	---	5
46	16	6	---	14	---	3	---	---	---	---	6
75	20	6	---	35	---	3	---	---	---	---	7
58	20	6	---	10	---	3	---	---	---	---	8
68	10	6	---	18	---	---	---	---	---	---	13
125	12	8	---	1	---	5	---	---	---	---	14
78	20	6	56;75	42	---	7	---	---	---	---	15

TABLE 16

Well location		Owner	Driller	Oate completed	Use	Alti- tude of land surface (feet)	Topo- graphic setting	Aquifer, litholo
Number	Lat-Long							
Ju- 16	4030-7725	Margaret and M. 8. Groninger	---	---	H	520	H	Dop/---
17	4032-7723	8reyer Ice Cream Co.	R. R. Hornberger	1934	C	440	V	OSkt/---
18	4032-7723	do.	Alvin R. Stewart	---	C	440	V	DSkt/---
19	4032-7724	William Icenburg	---	---	H	440	V	Sc/---
20	4033-772S	Guy Stuart	---	---	H	480	V	DSkt/---
22	4031-7720	Supplee-Wills-Jones Milk Co.	---	---	N	440	V	Swc/---
23	4031-7720	G. W. Leister	---	---	H	460	V	DSkt/---
25	4033-7716	Maynard Fenicle	---	---	H	47S	V	OSkt/---
26	4033-7716	Gerald Wert	---	---	H	S60	S	Dm/---
27	4032-7717	Joe Heimbaugh	---	---	H	510	V	DSkt/---
28	4032-7718	Joseph Dreese	---	---	H	490	V	DSkt/---
29	4034-7719	J. E. Oavis	---	1917	H	540	S	Swc/---
32	4032-7721	Earl Hack	J. R. Freed	---	H	430	V	Om/---
33	4032-7721	Henderson	---	---	H	51D	V	Swc/sh
34	4D32-7722	Samuel 8ashore	---	---	H	560	H	Swc/---
57	4020-7738	Lowry McClure	---	---	H	720	S	Swc/---
58	4019-7739	Watson Newman	---	---	H	700	S	DSkt/---
59	4017-7741	Charles Devin	---	---	H	800	S	Swc/---
60	4021-7742	Samuel 8urdqe	---	---	H	920	V	Oh/---
61	4021-7741	I. C. Vaughn	---	---	H	860	V	Dh/---
63	4024-7737	State Game Turkey Farm	Harrisburg's Kohl 8ros.	---	H	650	S	Dmh/sh
65	4029-7729	David Hackenberry	---	---	H	530	V	DSkt/---
68	4027-7729	Thomas Hockenberry	---	---	H	580	V	Swc/---
71	4038-7717	McAlisterville Water Co.	---	---	U	800	S	Sbm/---
72	4D38-7716	do.	Hubler Well Orilling Co.	1953	P	6S0	V	Swc/ls
73	4038-7716	do.	Harrisburg's Kohl 8ros.	1947	P	660	V	OSkt/---
74	4D3D-7722	Port Royal Munic. Authority	---	1910	P	672	S	Swc/---
75	4D30-7722	Port Royal 8or.	---	1910	P	672	S	Swc/cash
76	4030-7722	Port Royal Munic. Authority	---	1955	P	677	S	Swc/---
80	4034-7713	Thompsontown Munic. Authority	---	---	P	640	V	Dmh/---
81	4034-7713	do.	---	---	P	660	V	Dmh/---
82	4034-7713	do.	Gilbert R. Zechman	1956	P	620	V	Dmh/---
83	4032-7721	Earl Hack	Hubler Well Orilling Co.	1934	H	430	V	Dm/---
84	4032-7721	W. E. Taylor	do.	1963	H	450	V	Don/---
85	4032-7721	Dick's Auto 8odyshop	do.	---	C	440	V	Oon/---
86	4032-7721	P. C. Willard	do.	1964	H	450	V	Dm/---
87	4037-7721	S. F. Metz	do.	1950	H	440	V	Dm/---
88	4032-7721	George Groninger	do.	1939	H	420	V	Om/---
89	4032-7719	Kepler	---	---	H	555	V	DSkt/---
9D	4032-7719	Kepler's Esso Station	Hubler Well Orilling Co.	---	C	S55	S	DSkt/---
91	4032-7720	Walker Twp. Sch.	---	---	T	530	S	OSkt/---
94	4033-7715	Thompsontown Holding Co.	Hubler Well Orilling Co.	19S3	N	510	S	OSkt/---
95	4036-7718	J. F. Schillingsford & Son	---	1946	C	560	V	Sbm/---
96	4D29-7722	Port Royal 8or.	Hubler Well Drilling Co.	1963	P	741	S	Sbm/sh
97	4029-7722	Port Royal Water Co.	---	1940	P	745	S	Sbm/---
98	4033-7716	Locust Run Community 8ldg.	Gilbert R. Zechman	19S9	T	580	S	Dm/---
100	4033-7723	St. Jude Roman Catholic Ch.	Hubler Well Orilling Co.	1958	T	530	S	Swc/---
101	4033-7723	C. O. Zimmerman	do.	---	C	570	S	Sbm/---
102	4033-7723	do.	do.	19S9	C	580	S	Sbm/---
104	4032-7720	WJUN Radio Station	do.	195S	C	480	S	DSkt/---
108	4037-7722	Lloyd Harding	Freed and 8ell	1964	H	800	S	Swc/sh
110	4039-7715	Arthur Eard	Milton H. Romig	1958	H	790	S	Sbm/sh
118	4D35-7718	Glen Stoner	Gilbert R. Zechman	1964	H	76S	S	Oon/ls
130	4D33-7722	D. E. Smith	Hubler Well Drilling Co.	19S1	H	518	S	Sbm/sh
131	4D33-7723	W. F. Piper	do.	1956	H	590	H	Swc/---
132	4034-7723	Max Manbeck	do.	1941	S	670	H	Sbm/---
134	4D35-7722	Tobe Auker	do.	1948	H	600	S	Sbm/---
135	4033-7723	Kenneth 8ardell	do.	19S4	C	560	S	Swc/sh
136	4033-7724	John Tetwiler	do.	1939	H	570	S	Sbm/---
137	4034-7723	Max Manbeck	do.	1956	U	670	V	Sbm/---
138	4034-7723	Larve Moist	do.	1957	H	470	S	Swc/---
139	4034-7723	Max Manbeck	do.	1965	U	670	H	Sbm/---
140	4029-7727	H. S. Naylor	do.	1942	H	490	V	DSkt/---
141	4030-7726	Graham Robinson	do.	1940	H	510	S	DSkt/---
142	4032-7722	Frank Fleisher	do.	1941	C	S60	S	Swc/---
143	4D3D-7724	C. L. Goodman	do.	1952	H	68S	H	DSkt/ls
144	4030-7724	Glen Kepner	do.	1940	H	SSS	S	Dmh/---
14S	4029-7723	George Landis	do.	1963	H	S75	S	Swc/---
146	4032-7722	John 8ashore	do.	1954	H	570	H	Swc/sh
147	4032-7722	Gerald Clark	do.	1940	H	440	V	OSkt/---
148	4032-7724	Charles Telfer	do.	1950	H	4SS	S	Sc/---
149	4030-7723	John Wall	do.	1939	H	490	S	OSkt/---
1S0	4032-7722	Earl Messimer	do.	1940	H	4SS	S	OSkt/sh
1S1	4037-7720	C. O. Smith	do.	1941	U	S70	S	Sbm/sh
1S2	4037-7720	Pine Grove Ch.	do.	1953	T	S85	S	Sbm/sh
153	4034-7721	O. Q. Adams	do.	19S0	H	610	S	OSkt/---
154	4032-7721	do.	do.	1956	H	440	S	Om/sh
155	4034-7721	John Adams	do.	1958	H	S3S	V	OSkt/ls

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
95	30	6	---	55	---	5	---	25	1050	---	Ju- 16
263	57	8	75;120;200;263	29	---	85	1.1	---	---	---	17
210	18	8	---	33	---	15	.12	50	---	7.1	18
94	15	6	---	26	---	3	---	---	---	---	19
96	28	6	---	38	---	3	---	---	---	---	20
85	43	8	---	39	---	80	---	---	---	---	22
75	14	6	---	35	---	3	---	---	---	---	23
60	---	6	---	3	---	3	---	---	---	---	25
70	40	6	---	20	---	3	---	---	---	---	26
95	72	6	---	45	---	6	.24	---	---	---	27
100	20	6	---	70	---	3	---	---	---	---	28
137	---	6	---	79	---	3	---	---	---	---	29
47	19	6	---	3	---	4	---	---	---	---	32
100	42	6	---	52	---	5	---	---	---	---	33
121	21	6	---	69	---	1	---	---	---	---	34
65	22	6	---	21	---	3	---	---	---	---	57
60	57	6	---	40	---	5	---	---	---	---	58
70	12	6	---	20	---	6	---	---	---	---	59
76	18	6	---	5	---	3	---	---	---	---	60
55	20	6	---	3	---	3	---	---	---	---	61
172	15	6	---	20	---	16	.32	---	---	---	63
61	8	6	---	15	---	3	---	---	---	---	65
52	12	6	---	10	---	3	---	---	---	---	68
472	---	8	---	70	7/65	12	.11	7	260	7.7	71
210	200	8	200	11	7/53	80	1.25	---	---	7.3	72
504	357	8	---	14	---	75	---	---	---	7.8	73
122	28	6	---	18	12/64	30	---	---	---	---	74
92	60	6	---	18	12/64	22	---	4	165	---	75
75	50	6	---	17	12/64	15	---	---	---	6.2	76
110	---	6	---	---	---	---	---	---	---	6.9	80
105	---	6	---	---	---	---	---	---	---	7.6	81
220	21	8	---	20	7/56	95	.14	---	---	7.6	82
50	22	6	---	38	---	3	---	---	---	---	83
65	28	6	52;65	18	10/63	9	---	---	---	---	84
80	--	6	---	---	---	---	---	---	---	---	85
110	30	6	30;80;110	21	9/64	10	.23	6	325	7.5	86
45	20	5	---	8	5/50	7	---	---	---	---	87
76	34	5	---	26	12/39	5	---	---	---	---	88
110	---	6	---	---	---	---	---	---	---	---	89
175	25	6	---	---	---	---	---	---	---	---	90
205	---	6	---	---	---	12	---	---	---	---	91
135	62	6	---	40	5/53	14	.7	---	---	---	94
55	---	6	---	6	10/64	10	---	---	---	---	95
248	---	6	---	31	6/65	17	---	6	180	---	96
225	---	6	---	30	6/65	16	.57	5	260	7.3	97
53	36	6	---	---	---	---	---	---	---	---	98
303	46	5	---	78	8/58	20	---	---	---	---	100
120	70	6	---	40	7/59	15	---	8	265	---	101
137	40	8	---	37	4/59	16	0.8	6	230	---	102
114	31	6	---	24	7/55	8	---	---	---	---	104
120	58	6	70;85;110	30	9/65	10	---	8	290	---	108
75	31	6	60	27	7/58	---	---	9	325	7.3	110
297	202	6	288	8	3/64	8	---	5	168	---	118
67	34	6	---	15	---	---	---	---	---	---	130
213	40	5	---	133	3/56	14	---	16	590	---	131
205	22	5	---	41	8/41	7	---	---	---	---	132
60	16	5	---	12	12/48	5	---	---	---	---	134
115	53	5	---	65	2/54	3	---	2	85	---	135
82	28	5	---	21	---	5	---	---	---	---	136
315	18	5	---	165	6/56	5	---	---	---	---	137
86	17	6	---	21	---	5	---	27	840	---	138
370	21	6	190	---	---	1	---	---	---	---	139
160	10	5	---	50	8/65	15	---	28	825	---	140
100	35	6	---	60	10/40	5	---	18	650	---	141
225	17	5	---	60	4/41	---	---	---	---	---	142
82	72	4	---	42	9/52	8	---	11	425	---	143
95	22	5	---	27	9/40	5	---	2	100	---	144
55	38	6	---	30	8/65	10	---	8	300	---	145
203	20	5	---	80	7/54	8	---	8	290	---	146
52	37	6	---	27	1/40	10	.67	24	860	---	147
218	20	5	---	30	9/50	5	---	20	4000	---	148
110	27	5	---	20	9/39	---	---	30	1000	---	149
75	28	6	---	45	10/40	9	---	16	560	---	150
55	23	5	---	8	3/41	8	---	---	---	---	151
62	26	5	---	7	7/53	20	1.3	---	---	---	152
180	113	5	---	100	9/50	8	---	11	380	6.9	153
69	20	6	---	9	3/56	22	4.4	14	620	---	154
59	20	6	---	9	8/58	6	---	55	1420	6.8	155

TABLE 16.

Well location								
Number	Lat-Long	Owner	Oriller	Date completed	Use	Alti- tude of land surface (feet)	Topo- graphic setting	Aquifer/ lithology
Ju-157	4033-7723	Pa. Outch Farms Inc.	Hubler Well Orilling Co.	1953	C	490	S	Swc/sh
158	4033-7723	do.	do.	1955	C	490	S	Swc/sh
159	4033-7723	do.	do.	1955	C	490	S	Swc/sh
160	4034-7724	R. F. Miller	do.	1957	H	518	V	Sbm/---
161	4036-7719	Merrill Gingrich	do.	---	H	570	V	Sbm/sh
162	4037-7718	Juniata Saddle Horse Assoc.	do.	1965	C	605	V	Swc/sh
163	4036-7719	Raymond Oiffenderfer	do.	1950	H	570	V	Sbm/sh
164	4036-7719	H. Shellenberger	do.	1957	H	570	V	Sbm/---
165	4031-7729	John Foltz	do.	1949	H	598	V	OSkt/---
166	4031-7729	C. G. Smith	do.	1947	H	658	S	Swc/sh
168	4033-7726	8lair Lauver	do.	1950	H	560	S	Swc/sh
169	4031-7729	Stoey Lyter	do.	1940	H	590	V	DSkt/---
171	4032-7727	Ernest Lauver	do.	1941	H	560	S	OSkt/ls
172	4031-7729	Paul Arnold	do.	1963	H	590	V	OSkt/ls
174	4029-7729	Miles lmes	do.	1951	H	540	W	OSkt/---
175	4029-7728	Floyd Ciccolini	do.	1955	H	475	V	Om/sh
176	4029-7729	Mrs. Mary Cooper	do.	1950	H	590	S	Sbm/---
177	4029-7729	C. M. Mark	do.	1961	H	720	S	Sbm/sh
179	4028-7726	Walter Eichenberger	do.	1939	H	620	S	Swc/---
180	4028-7729	Russell 8oyer	do.	1939	U	615	S	Omh/sh
181	4028-7728	E. C. Cooper	do.	1950	H	515	S	DSkt/sh
182	4029-7726	William Stimmel	do.	1951	U	620	S	DSkt/sh
183	4034-7717	Amish Sch.	do.	1963	T	630	S	Dop/sh
184	4033-7718	Wilbur Ranck	do.	1950	H	705	S	Dmh/sh
185	4033-7717	Joe Hackenberger	do.	1949	H	600	S	Dmh/---
186	4033-7717	Ben Wagner	do.	1957	H	610	S	Dmh/---
187	4033-7717	O. R. Yorks	do.	1963	H	650	V	Dmh/---
188	4038-7720	O. H. Hower	do.	1955	H	740	V	Sbm/ls
189	4038-7721	Charles Hower	do.	1955	H	730	S	Sbm/sh
190	4033-7719	R. A. Rowe	do.	1940	H	580	S	Om/---
191	4032-7718	Centre Lutheran Ch.	do.	1940	T	490	V	OSkt/---
192	4033-7718	Minnie Leonard	do.	1960	H	655	S	Dm/---
193	4032-7718	Ken Leach	do.	1963	H	500	V	OSkt/sh
194	4033-7718	Charles Colyer	do.	1964	H	655	S	Omh/---
195	4032-7717	8lair Oetra	do.	1950	H	485	V	DSkt/---
196	4032-7721	Walter Smith	do.	1939	H	450	V	Swc/---
197	4032-7721	J. M. Rhine	do.	1952	H	480	S	Oop/---
198	4031-7719	Charles Rowe	do.	1950	H	430	V	DSkt/---
200	4032-7721	James Gill	do.	1944	H	430	S	Oon/---
201	4032-7721	Ronald 8ell	do.	1947	H	440	V	DSkt/---
203	4032-7721	Park Haubert	do.	1942	H	450	V	DSkt/sh
204	4032-7719	Oonald Hower	do.	1956	H	560	S	DSkt/---
205	4033-7721	Ken Leach	do.	1964	H	440	V	Sbm/sh
206	4032-7721	Donald 8ook	do.	1947	H	440	V	DSkt/---
207	4032-7721	Thomas Cassett	do.	1947	H	455	S	Om/---
208	4033-7720	William Oavis	do.	1955	H	460	V	OSkt/---
209	4032-7721	Charles Ouncan	do.	1954	H	490	S	OSkt/---
210	4032-7721	P. S. Wagner	do.	1942	H	440	V	Oop/---
212	4032-7721	J. N. Orwig	do.	1964	H	490	S	OSkt/---
213	4032-7720	Jerand Zook	do.	1963	H	430	S	Oon/---
214	4032-7721	Mary Arnold	do.	1947	H	425	V	Om/---
215	4032-7721	J. R. McBurney	do.	1959	H	430	V	Dm/---
216	4032-7721	Robert Haubert	---	1963	H	440	V	OSkt/ls
217	4038-7715	E. C. Schell	Hubler Well Drilling Co.	1955	H	710	V	DSkt/---
218	4038-7717	Robert Naylor	do.	1963	H	725	V	Sc/---
219	4037-7714	Juniata Limestone Co.	do.	1961	N	755	S	OSkt/ls
220	4038-7717	W. C. Colegrove	do.	1951	H	660	V	Sbm/---
221	4038-7715	Norman Master	do.	1964	H	680	V	OSkt/---
222	4038-7717	Keith Naylor	do.	1959	H	660	V	Swc/---
223	4034-7717	C. C. Ulsh	do.	1952	H	565	V	Swc/---
224	4037-7717	J. S. Thompson	do.	1965	H	640	V	Swc/---
225	4037-7717	do.	---	---	H	940	V	Swc/---
229	4035-7716	Noah Peachy	Hubler Well Drilling Co.	1961	H	660	S	Swc/---
230	4033-7715	M. R. Leach	do.	1960	H	490	V	OSkt/---
231	4030-7728	J. 8. Groninger	do.	1964	H	600	H	Swc/---
232	4031-7726	lda Smith	do.	1956	H	610	S	Sbm/---
236	4034-7724	Paul Rickenbaugh	do.	1950	H	530	W	Sbm/---
237	4034-7727	H. B. Frye	do.	1939	H	510	V	OSkt/---
239	4036-7725	J. E. Singer	do.	1939	H	500	V	Sbm/---
240	4036-7724	James Notestine	do.	1960	H	560	W	Sbm/---
241	4036-7724	Stewart Singley	do.	1951	H	500	W	Sbm/sh
242	4035-7725	J. F. Miller	do.	1950	H	625	S	Sbm/sh
243	4027-7729	Frank Gray	do.	1940	H	555	S	Swc/ls
244	4030-7724	Paul Towsey	---	1959	H	662	S	Omh/---
245	4030-7724	do.	---	---	S	585	W	Omh/---
246	4033-7725	Russell Henderson	Hubler Well Orilling Co.	1965	H	505	S	Sbm/---
247	4031-7725	Robert Yohn	---	1965	U	470	S	Sbm/---
248	4032-7722	Earl Messimer	Hubler Well Drilling Co.	1948	U	470	S	DSkt/---
249	4033-7722	C. O. Zimmerman	---	1965	H	695	S	Sbm/---
250	4034-7722	C. L. Adams	Gilbert R. Zechman	1964	H	545	H	DSkt/---
251	4032-7724	Franklin Campbell	---	---	H	455	V	Sc/---
253	4034-7723	Earl Mahlin, Jr.	John Thran	1965	H	465	V	Sbm/---
254	4031-7724	James Wert	---	1965	H	490	S	Sbm/---
255	4033-7726	Roy Whitesel	---	1960	H	635	S	Sc/---
256	4033-7727	R. l. Richmond	---	1963	H	700	S	St/---
257	4035-7724	John Mann	---	1960	H	455	V	DSkt/---

(CONTINUED)

Total depth below land surface (feet)	Casing Depth (feet)	Casing Diameter (inches)	Depth(s) to water-bearing zone(s) (feet)	Static water level Depth below land surface (feet)	Static water level Date measured (mo/yr)	Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
133	12	8	---	53	12/53	45	---	---	---	---	Ju-157
200	42	8	---	50	12/55	45	---	---	---	---	158
195	21	8	---	45	11/55	45	---	---	---	---	159
350	25	8	---	0	9/57	3	.08	11	425	---	160
75	26	5	---	17	---	15	---	---	---	---	161
48	23	6	---	20	1/65	4	---	---	---	---	162
60	27	5	---	15	6/50	16	---	---	---	---	163
69	32	5	---	19	10/57	15	---	---	---	---	164
66	66	5	---	31	4/49	5	---	17	495	---	165
65	26	5	---	10	3/47	21	---	10	340	---	166
82	16	5	---	25	5/50	10	---	---	---	---	168
102	---	5	---	37	10/40	---	---	---	---	---	169
127	20	5	---	27	5/41	10	---	---	---	---	171
87	83	6	---	32	5/63	16	---	14	470	---	172
68	21	6	---	15	1/51	9	---	32	800	---	174
47	9	5	---	10	5/55	1	---	---	---	---	175
75	29	5	---	15	5/50	13	.43	---	---	---	176
130	46	6	---	50	7/61	10	---	---	---	---	177
77	43	5	---	26	12/39	5	---	---	---	---	179
101	35	5	---	23	10/39	30	---	---	---	---	180
89	26	6	---	25	12/50	5	.15	19	685	---	181
57	27	6	---	12	1/51	10	---	---	---	---	182
89	32	6	---	54	7/63	2	---	---	---	---	183
80	17	5	---	20	10/50	3	---	---	---	---	184
40	22	5	---	10	5/49	10	---	---	---	---	185
62	22	5	---	20	7/57	9	---	---	---	---	186
65	---	6	---	15	5/63	10	---	7	225	6.9	187
55	20	5	---	10	8/55	10	---	7	215	---	188
57	20	5	---	12	8/55	10	.34	11	460	---	189
54	25	5	---	14	6/40	2	---	---	---	---	190
61	56	5	---	51	11/40	---	---	13	---	---	191
70	22	6	---	20	10/60	20	---	6	300	7.4	192
68	24	6	---	24	4/63	20	---	---	---	---	193
86	5	6	---	26	5/64	10	---	8	340	7.3	194
91	63	5	---	46	12/50	8	---	---	---	---	195
60	36	5	---	19	12/39	10	---	---	---	---	196
128	34	5	---	28	8/52	7	---	---	---	---	197
77	64	5	---	37	8/53	6	---	---	---	---	198
65	24	5	---	15	2/44	8	---	9	360	---	200
72	---	6	---	19	8/65	5	---	---	---	---	201
70	36	5	---	14	2/42	15	---	---	---	---	203
161	---	5	---	61	9/56	1	---	---	---	---	204
70	41	6	---	10	4/64	10	---	---	---	---	205
59	26	6	---	18	8/65	10	.4	---	---	---	206
70	28	5	---	12	2/47	10	---	---	---	---	207
45	42	5	---	17	9/55	12	---	---	---	---	208
92	77	5	---	57	4/54	12	---	1	55	5.6	209
43	34	5	---	13	9/42	5	---	---	---	---	210
124	70	6	---	64	3/64	11	---	---	---	---	212
72	19	6	---	7	7/63	2	---	9	310	---	213
60	30	5	---	26	8/65	---	---	11	360	6.9	214
85	31	6	---	20	9/59	5	---	8	280	---	215
57	23	6	---	12	11/63	10	---	---	---	---	216
64	23	5	---	18	8/55	25	---	---	---	---	217
79	---	6	---	19	8/66	10	---	5	200	7.2	218
215	64	6	150;190;215	65	3/61	5	---	---	---	---	219
82	15	5	---	6	10/51	12	---	7	240	---	220
76	25	6	---	21	6/64	15	---	9	380	7.2	221
85	18	6	---	20	6/59	15	---	---	---	---	222
51	20	5	---	8	8/65	12	2.4	12	330	7.6	223
73	---	6	---	25	7/65	50	6.1	16	750	7.3	224
25	25	36	---	23	7/65	3	---	22	710	7.0	225
90	53	6	---	30	5/61	15	---	---	---	---	229
70	50	6	---	35	3/60	10	---	8	240	6.7	230
160	19	5	---	80	4/64	5	---	12	475	---	231
74	23	6	---	39	9/56	30	---	8	340	---	232
82	6	5	---	10	9/50	14	.7	18	640	---	236
101	27	5	---	6	9/39	---	---	---	---	---	237
70	52	6	---	15	10/39	---	---	---	---	---	239
80	21	6	---	20	5/60	10	---	6	280	---	240
50	25	5	---	8	3/51	10	.67	8	360	---	241
128	16	6	---	70	6/60	20	---	3	115	6.0	242
61	30	6	35	18	1/40	30	---	---	---	---	243
84	20	6	---	31	1959	20	---	7	275	---	244
75	---	6	---	F	8/65	3	---	7	310	---	245
70	17	6	---	20	8/65	6	---	14	550	---	246
310	0	---	---	38	8/65	1	.1	8	380	---	247
78	---	6	---	49	---	---	---	---	---	---	248
268	30	6	---	103	8/65	1	.15	4	240	---	249
197	44	6	---	50	---	7	---	14	430	---	250
135	15	6	---	20	6/64	75	---	12	470	---	251
81	22	6	---	2	9/65	1	---	---	---	---	253
90	30	6	---	40	9/65	---	---	9	360	---	254
75	17	6	---	12	3/60	5	.12	5	165	---	255
50	35	6	---	---	---	1	---	5	220	---	256
75	38	6	69	14	3/61	15	---	15	500	---	257

TABLE 16.

Well location Number	Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Ju-258	4033-7717	R. E. Saner	---	1965	H	520	S	DSkt/ls
259	4033-7720	Howard Zendt	Hubler Well Drilling Co.	1950	H	460	V	Sbm/---
260	4034-7719	C. L. Duncan	---	1964	H	585	H	Swc/ls
261	4035-7715	C. O. Dimm	Gilbert R. Zechman	1961	H	735	S	DSkt/ls
262	4034-7721	R. I. Longacre	---	1935	H	530	V	DSkt/---
263	4035-7715	C. R. Dimm	Gilbert R. Zechman	1961	H	695	S	DSkt/ls
264	4037-7720	Jay Sanger	---	1964	H	560	S	Sbm/---
265	4037-7718	Lloyd Fogelman	---	---	H	610	V	Swc/---
266	4037-7718	R. L. Seaber	Milton H. Romig	1961	H	630	V	Swc/---
267	4035-7724	W. N. Quigley	---	1964	I	570	S	DSkt/---
268	4037-7724	Miles Gray	---	1965	H	645	V	Swc/---
269	4036-7728	J. D. Pecht	---	1965	C	465	V	Sc/---
270	4034-7723	Eastern Milk Producers	Hubler Well Drilling Co.	1938	N	450	V	DSkt/---
278	4033-7719	Grant Klase	---	1965	H	535	V	Dm/---
279	4037-7714	Dean Yeater	Gilbert R. Zechman	1966	H	850	H	Dop/ls
280	4037-7718	Juniata Recreation Center	do.	1966	H	580	V	Swc/---
281	4032-7721	Wayne Stuber	---	1966	H	495	H	DSkt/---
282	4032-7721	James Portzline	---	1966	H	480	S	DSkt/---
283	4031-7723	U. S. Geol. Survey	Joe Cekovich	1966	U	423	V	DSkt/cash
284	4038-7717	Paul Gingrich	---	1966	H	715	V	Sbm/---
288	4038-7715	Dora Dressler	Gilbert R. Zechman	1963	H	960	H	Dop/---
289	4035-7721	R. J. Richardson	Hubler Well Drilling Co.	1955	H	615	S	Sbm/sh
295	4035-7716	Oscar Baney	---	1964	U	780	W	Dm/---
299	4034-7716	Charles Bender	Gilbert R. Zechman	---	H	740	W	Dm/---
304	4036-7705	J. Hahn	Gary L. Stone	1977	H	640	S	Dmh/sh
305	4036-7705	M. Hahn	do.	1977	H	640	S	Dmh/sh
307	4036-7711	Whiteland United Methodist Ch.	Hubler Well Drilling Co.	1978	T	650	S	Dtr/---
308	4035-7709	Paul Hood	Gary L. Stone	1976	H	520	V	Omh/---
309	4036-7714	E. Schlegel	Hubler Well Drilling Co.	1978	H	620	V	Omh/---
310	4036-7714	W. Schlegel	do.	1978	H	620	V	Dmh/ls
311	4038-7713	Charles Dowling	Gilbert R. Zechman	1977	H	780	S	Dop/ss
313	4039-7714	P. Saner	Hubler Well Drilling Co.	1978	H	700	V	DSkt/ls
314	4039-7711	Leroy Stroup	do.	1973	H	700	V	DSkt/sh
316	4040-7715	David Varner	do.	1975	H	840	S	Sbm/---
317	4038-7714	R. Varner	Hubler Drilling & Pump Service	1979	H	910	H	Dm/ls
318	4037-7706	R. Engle	Hubler Well Drilling Co.	1978	H	780	H	Dbh/ls
326	4038-7713	Rodney Hart	Gilbert R. Zechman	1978	H	920	S	Dmh/---
327	4035-7718	A. Troyer	Hubler Well Drilling Co.	1979	H	680	S	Don/---
328	4033-7718	D. Sauerman	Richard A. Earnest	1978	H	685	S	Dmh/sh
329	4035-7719	Dressler	Hubler Drilling & Pump Service	1978	H	725	S	Dop/---
330	4034-7715	H. Brown	---	1979	H	810	H	Dm/---
331	4035-7722	Haubert Builders	Hubler Drilling & Pump Service	1978	H	640	S	Sbm/---
332	4020-7741	T. Winward	Martin W. Shatzer	1979	H	915	S	Dciv/sh
333	4032-7724	Lions Park	Hubler Well Drilling Co.	1978	H	460	S	Sbm/---
334	4031-7729	K. Van Bortel	Hubler Drilling & Pump Service	1978	H	610	V	DSkt/ls
335	4034-7729	R. O'Donnell	do.	1979	H	880	S	Sbm/---
336	4035-7726	M. Schelegal	do.	1978	H	500	V	DSkt/ls
337	4036-7724	R. Myers	do.	1978	H	645	S	Sbm/---
338	4036-7724	D. Sweitzer	Hubler Well Drilling Co.	1978	H	585	S	DSkt/ls
339	4033-7723	W. Manbeck	do.	1978	H	505	S	Swc/---
341	4038-7715	B. Campbell	Hubler Drilling & Pump Service	1978	H	775	S	DSkt/---
345	4039-7716	W. Nale	Hubler Well Drilling Co.	1979	H	1085	H	Sc/---
351	4024-7737	U. S. Geol. Survey	do.	1968	U	635	V	Dmh/sh
352	4041-7517	Lost Creek Rod & Gun Club	---	1964	U	1531	S	Obe/---
353	4030-7731	David Henry	Gary L. Stone	1978	H	649	S	Swc/---
355	4035-7710	J. Pyle	Hubler Drilling & Pump Service	1978	H	660	S	Dmh/---
356	4038-7714	D. Landis	do.	1978	H	840	S	DSkt/---
361	4033-7723	Empire Kosher Poultry	---	---	N	480	V	Swc/---
362	4033-7723	do.	---	---	N	480	V	Swc/---
363	4033-7723	do.	---	---	N	490	V	Swc/---
364	4033-7723	do.	---	---	N	430	V	Swc/---
365	4033-7724	do.	---	---	N	430	V	Swc/---
366	4033-7723	do.	---	---	N	420	V	Swc/---
367	4033-7723	do.	---	---	N	430	V	Swc/---
368	4033-7723	do.	---	---	N	450	V	Swc/---
								MIFFLIN
Mf- 1	4042-7733	C. C. Naginey	---	---	U	680	V	Ocn/---
7	4044-7732	Alexander Burns	---	---	H	800	V	Or/ls
20	4036-7743	Penn Reed Milk Co.	---	---	C	800	V	Obf/ls
26	4035-7735	The Viscose Co.	Layne-New York Co., Inc.	---	U	460	V	Swc/---
28	4035-7735	do.	---	---	N	480	V	Swc/---
46	4031-7734	Lewistown Dairy Farm	---	---	C	600	S	DSkt/ls
47	4037-7734	Lewistown Pure Milk Co.	---	---	C	530	V	Doo/ls
48	4036-7733	Supplee-Wills-Jones Milk Co.	---	---	N	480	V	Swc/---
49	4035-7734	Embassy Theater	---	1930	A	490	V	Swc/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
105	18	6	90	25	---	---	---	18	520	7.2	Ju-258
185	100	6	---	F	---	---	---	6	750	---	259
164	20	6	160	80	1/64	---	---	---	---	---	260
223	40	6	---	92	8/65	5	.2	17	870	---	261
61	---	6	---	24	8/65	---	---	21	---	---	262
223	35	6	---	86	8/65	5	---	15	430	---	263
110	---	6	---	---	---	8	---	---	---	---	264
27	---	6	---	19	8/65	---	---	---	---	---	265
86	40	6	---	---	---	---	---	---	---	---	266
180	---	6	---	110	9/65	10	---	14	525	---	267
61	---	6	18;30;60	12	9/65	25	---	7	280	7.7	268
90	32	6	80	20	6/65	10	.30	5	185	7.5	269
150	90	8	---	28	9/38	175	---	18	650	---	270
208	---	6	---	---	---	15	---	---	---	---	278
222	137	6	218	30	2/66	5	---	---	---	---	279
72	62	6	---	3	5/66	30	1.80	8	270	7.6	280
100	48	6	80	60	6/66	6	---	---	---	---	281
98	---	6	---	43	5/66	3	.26	11	350	7.3	282
375	26	6	---	8	6/66	102	63	35	1700	---	283
92	21	6	47;72;90	17	9/66	2	.17	3	100	---	284
422	60	6	150;420	180	---	---	---	---	---	---	288
53	10	6	20;50	5	9/66	12	.40	2	55	---	289
82	25	6	---	17	9/66	20	.88	1	82	---	295
105	---	---	---	---	---	15	---	---	---	---	299
198	43	6	175;185	21	5/80	24	---	3	170	---	304
248	42	6	175;230	95	11/77	10	---	---	---	---	305
130	21	6	60;115	65	8/78	5	---	---	---	---	307
198	42	6	95;185	F	6/76	5	---	---	---	---	308
115	60	6	50;75;95	95	6/78	10	---	---	395	---	309
120	21	6	44;85;103	100	6/78	10	---	---	360	---	310
221	200	6	215	50	5/77	25	---	1	50	---	311
220	40	6	75;130;190	200	4/78	10	---	---	---	---	313
60	20	6	---	---	7/73	5	---	---	---	---	314
55	20	6	40	12	8/75	5	---	6	265	---	316
320	209	6	250;300	---	3/79	4	---	---	---	---	317
270	36	6	180;260	170	7/78	5	---	2	90	---	318
177	60	6	92;171	F	5/80	7	---	5	220	---	326
215	185	6	190;210	103	5/80	5	---	2	80	---	327
198	42	6	90;175	20	3/78	6	---	---	---	---	328
225	201	6	215	50	9/78	12	---	---	---	---	329
301	58	6	135;284	60	6/79	8	---	---	---	---	330
100	20	6	62;90	13	5/80	---	---	14	595	---	331
82	38	6	75	20	5/79	12	---	---	---	---	332
220	20	6	75;130;180	175	3/78	4	---	---	---	---	333
150	30	6	135;141	---	9/78	12	---	---	---	---	334
150	110	6	130	---	4/79	6	---	---	---	---	335
150	43	6	143	---	12/78	20	---	---	---	---	336
250	47	6	175;250	---	8/78	15	---	---	---	---	337
220	125	6	160;200	120	9/78	10	---	---	---	---	338
170	37	6	90;150	78	5/80	10	---	8	345	---	339
225	100	6	215	---	11/78	15	---	---	---	---	341
270	56	6	175;255	149	5/80	7	---	10	330	---	345
110	18	6	---	16	6/68	9	.16	7	220	---	351
1036	---	---	---	---	---	---	---	---	---	---	352
98	38	6	60;85	12	5/78	60	---	---	---	---	353
260	60	6	140;240	54	5/80	8	---	2	110	---	355
225	26	6	70;210	64	5/80	15	---	16	650	---	356
350	54	8	---	---	---	125	---	---	---	---	361
200	40	8	---	---	---	125	---	---	---	---	362
90	---	8	---	---	---	65	---	---	---	---	363
390	40	8	---	---	---	125	---	---	---	---	364
200	28	8	---	---	---	210	---	---	---	---	365
305	41	8	---	---	---	125	---	---	---	---	366
310	39	8	---	---	---	125	---	---	---	---	367
300	40	8	---	---	---	250	---	---	---	---	368
COUNTY											
28	---	36	---	23	---	---	---	---	---	---	Mf- 1
124	4	6	---	64	---	5	---	---	---	---	7
42	---	8	---	1	---	60	---	---	---	---	20
203	32	8	33;100;203	100	---	25	---	---	---	---	26
161	---	8	48;58;62	35	---	360	16	---	---	---	28
140	50	6	---	100	---	5	---	---	---	---	46
187	117	8	---	40	---	150	---	---	---	---	47
140	---	8	---	F	---	35	7.0	---	---	---	48
145	70	6	---	40	---	90	---	---	---	---	49

TABLE 16.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/lithology
Number	Lat-Long							
Mf- 50	4035-7734	Lewistown Ice & Storage Co.	---	---	C	470	V	DSkt/ls
51	4035-7734	Penn Central Light & Power Co.	---	---	C	470	V	Swc/ls
54	4042-7724	Elder Will	---	1932	H	765	S	Dm/---
75	4039-7728	Max Fisher	Freed and Bell	1962	H	670	S	Doo/---
76	4039-7725	Mr. Carter	do.	1960	H	600	S	DSkt/ls
77	4040-7724	Claire Boreman	do.	1960	H	595	V	DSkt/ls
78	4041-7727	Donald Collins	do.	1960	H	690	S	Don/---
79	4039-7727	Donald Horner	do.	1960	H	630	S	Doo/---
80	4039-7727	Jess Yeater	do.	1960	H	590	V	Doo/---
82	4039-7727	Rosenberry	do.	1960	H	590	V	Doo/---
83	4039-7728	Calvin Bargo	do.	1960	H	655	S	Doo/---
84	4039-7727	William Koontz	do.	1961	H	695	S	Doo/sh
85	4039-7728	Richard Ritter	do.	1964	H	640	S	Doo/---
87	4038-7728	Lewis Snyder	do.	1964	H	600	S	DSkt/ls
88	4039-7728	Albert Brower	do.	1964	H	630	S	Doo/---
93	4039-7728	D. Wray	do.	1963	H	780	S	Dop/ls
95	4039-7727	Harry Durst	do.	1962	H	630	S	Doo/---
96	4038-7729	Daniel Shilling	do.	1962	H	630	S	Doo/---
101	4042-7725	Marlin Henry	do.	1961	H	780	S	Doo/sh
102	4040-7725	Robert Davis	do.	1961	H	610	V	Doo/sh
104	4037-7730	Arthur Weimer	do.	1962	H	520	S	DSkt/---
105	4041-7727	Donald Loht	do.	1965	H	660	S	Doo/sh
106	4039-7729	J. R. Goss	do.	1962	S	655	V	DSkt/ls
107	4041-7727	Donald Loht	do.	1965	H	660	V	Don/---
109	4041-7722	H. E. Kline	do.	1965	H	780	S	Dop/sh
110	4038-7726	Noerr	do.	1962	H	622	S	Swc/---
111	4040-7726	Lee Wilt	do.	1962	H	660	V	Dmh/---
112	4040-7725	Norman Shawver	do.	1962	H	598	V	Doo/---
113	4042-7724	Thomas Wray	do.	1963	H	720	S	Doo/---
114	4040-7725	E. Derry Sportsman Assoc.	do.	1963	H	745	S	Dmh/---
115	4041-7725	J. W. Rupe	do.	---	H	640	V	Dmh/---
116	4039-7726	Irvin Paige	do.	1963	H	600	S	DSkt/ls
117	4040-7725	Charles Marker, Jr.	do.	1963	H	600	S	Dm/---
119	4039-7726	Marlin Aurand	do.	1964	H	723	S	Doo/---
120	4041-7721	Russel Hoffman	Gilbert R. Zechman	1961	H	780	S	Doo/---
121	4040-7725	Dallas Brinninger	Freed and Bell	1964	H	635	S	Doo/sh
122	4039-7727	Gene Boreman	do.	1964	H	580	V	Doo/---
123	4040-7725	Thomas Deamer	do.	1964	H	660	S	Doo/sh
125	4042-7723	Palmer Snook	do.	1964	H	723	S	Dmh/sh
126	4041-7724	George Kline	do.	1964	H	720	S	Dmh/---
127	4039-7727	Charles Kenepp	do.	1963	H	605	S	Doo/---
130	4042-7723	Kenneth Mowery	do.	1963	H	695	S	Dmh/---
131	4041-7724	Mrs. Neta Spigelmyer	do.	1963	H	610	V	Dmh/---
132	4040-7726	Foster Smith	do.	1963	H	710	S	Dmh/---
133	4043-7723	S. C. Olnick	Milton H. Romig	1959	H	790	S	Dmh/---
134	4042-7722	Samuels U. Ch. of Christ	do.	1962	T	660	V	Dmh/sh
137	4041-7723	Larry Marks	do.	1961	H	695	S	Dmh/sh
138	4040-7724	Harold Sellers	do.	1961	H	710	S	Dop/ss
139	4042-7723	Palmer Snook	do.	1962	H	725	S	Dmh/sh
140	4042-7722	Clarence Sheriff, Jr.	do.	1960	H	670	V	Dmh/sh
141	4040-7725	Charles Jones	do.	1960	H	620	S	Dm/sh
149	4036-7744	Munic. Authority of Union Twp.	---	1966	P	---	V	Obl/---
151	4043-7728	Reeds Gap State Park No. 5	Lester E. Gladfelter, Jr.	1953	P	800	S	Or/---
152	4043-7728	Reeds Gap State Park No. 4	F. L. Bollinger & Sons	1965	T	812	V	Or/sh
153	4043-7728	Reeds Gap State Park No. 3	Lester E. Gladfelter, Jr.	1953	P	830	V	Or/---
154	4043-7728	Reeds Gap State Park No. 2	do.	1953	P	820	V	Or/---
155	4043-7728	Reeds Gap State Park No. 1	do.	1959	P	800	V	Or/---
156	4038-7728	Harry Knepp	Hubler Well Drilling Co.	1960	H	580	V	DSkt/ls
157	4039-7725	Ray Goss	do.	1959	H	563	V	DSkt/---
159	4038-7727	Albert Lepley	do.	1962	H	575	V	DSkt/ls
165	4041-7726	C. R. Freed	---	1959	H	765	S	Dop/ls
166	4042-7726	George Gesselman	Hubler Well Drilling Co.	1942	H	780	S	Don/ls
168	4039-7727	Guy Spigelmyer	do.	1959	H	575	V	Dm/---
169	4040-7727	E. H. Flood	do.	1961	H	600	V	Dmh/---
170	4040-7727	do.	do.	1964	H	595	V	Dmh/---
171	4040-7729	William Lepley	do.	---	H	590	V	Dmh/---
172	4041-7727	Lewis Parsons	do.	1959	H	665	S	Dm/---
176	4040-7725	Ralph Grabbe	do.	1961	H	600	V	Dm/sh
177	4042-7721	Henry Kline	do.	1960	H	645	V	Dmh/---
180	4041-7723	Bruce Goss	Freed and Bell	1965	H	665	S	Dmh/---
181	4041-7724	J. E. Wike	Gilbert R. Zechman	---	H	725	H	Dmh/---
182	4039-7726	Earl Wilson	do.	1963	U	590	S	DSkt/---
183	4040-7724	George Wagner	do.	1956	S	755	S	DSkt/---
184	4040-7724	do.	do.	1958	H	715	S	Dop/sh
186	4041-7727	R. E. Wagner	Milton H. Romig	1959	H	720	S	Dop/---
198	4043-7721	Samuel Yetter	---	1965	H	775	S	Dmh/sh
200	4040-7723	Norman Hower	Gilbert R. Zechman	1965	H	705	S	Dop/---
201	4041-7727	R. W. Wagner	do.	1966	H	720	S	Dop/ls

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
235	---	8	---	40	---	100	---	---	---	---	Mf- 50
201	30	6	---	20	---	150	---	8	---	---	51
86	32	6	---	35	---	3	---	---	---	---	54
90	45	6	68;84	23	11/62	7	.1	---	---	---	75
75	57	6	60	31	3/60	7	.16	---	---	---	76
54	44	6	50	27	4/60	8	.3	6	215	---	77
90	35	6	37;55;62;84	24	5/60	6	.1	---	---	---	78
80	30	6	35;64;72	28	8/60	7	.15	---	---	---	79
65	22	6	34;60	15	12/60	20	.7	---	---	---	80
50	---	6	42	22	12/60	20	2	---	---	---	82
80	29	6	35;66;75	16	8/60	7	.1	5	230	---	83
60	33	6	---	18	1/61	7	.17	---	---	---	84
95	50	6	85	20	10/64	20	.4	---	---	---	85
70	57	6	62;65	35	6/64	20	2	6	260	---	87
100	63	6	80;95	15	10/64	20	1.3	---	---	---	88
170	144	6	150;165	60	11/63	10	---	6	240	---	93
82	53	6	70	14	6/62	20	1.3	6	230	---	95
100	42	6	60;88;95	15	4/62	10	.12	6	260	---	96
120	35	6	40;85;110	30	9/61	10	.1	---	---	---	101
90	33	6	75	10	9/61	6	.1	---	---	---	102
150	132	6	145	40	6/62	20	---	---	---	---	104
95	68	6	91	8	11/65	20	1.3	---	---	---	105
225	102	6	150;193;215	70	8/62	20	1.0	---	415	---	106
125	33	6	120	5	4/65	20	.8	---	---	---	107
240	225	6	235	168	3/65	20	.7	5	170	6.9	109
130	78	6	90;118	30	9/62	20	.6	---	---	---	110
50	27	6	46	1	6/62	7	.14	5	290	---	111
105	25	6	55;100	40	6/62	7	.1	7	270	---	112
110	52	6	61;69;90	28	1/63	20	.6	---	---	---	113
140	52	6	68;132	60	3/63	20	1	---	---	---	114
50	---	6	---	42	4/63	10	1.3	---	---	---	115
150	61	6	72;92;132	68	5/63	7	.1	---	---	---	116
75	28	6	35;50	42	6/63	20	1.4	---	---	---	117
90	11	6	30	20	12/64	3	.05	---	---	---	119
190	180	6	182	140	7/61	16	---	---	---	---	120
140	27	6	---	35	10/64	6	.1	---	---	---	121
110	27	6	100	20	9/64	5	.06	5	215	---	122
150	28	6	90;125	40	8/64	7	.06	7	365	---	123
70	24	6	30;40;55;60	20	6/64	20	1.3	3	140	---	125
170	38	6	150;170	50	5/64	10	.1	---	---	---	126
100	41	6	55;78;90	35	11/63	20	1.3	---	---	---	127
155	44	6	88;145	30	10/63	20	1	4	215	---	130
65	25	6	---	26	7/63	20	1.7	5	250	---	131
125	66	6	81;110;119	38	6/63	20	.7	5	220	---	132
64	20	6	30;60	20	---	10	1	---	---	---	133
90	33	6	70	31	9/65	11	1.0	---	---	---	134
103	52	6	---	---	---	5	---	3	110	---	137
114	63	6	---	72	10/65	---	---	2	95	---	138
59	21	6	---	12	---	---	---	4	190	---	139
50	22	6	---	6	9/65	10	---	4	160	6.7	140
80	24	6	40;70	9	7/60	10	.5	---	---	---	141
200	32	8	35;75;145; 187	27	5/66	350	27	---	---	---	149
38	34	6	35	22	5/53	15	.8	---	---	---	151
250	78	8	---	24	12/65	46	.52	---	160	---	152
65	45	6	153	19	5/53	8	.25	6	---	7.8	153
56	28	6	56	11	5/53	10	.5	---	---	---	154
40	27	6	40	5	5/59	10	.59	5	230	7.5	155
80	21	6	---	35	7/60	5	---	15	590	---	156
70	42	6	---	5	5/59	12	---	---	---	---	157
121	74	5	120	25	1/62	5	---	10	365	---	159
134	56	6	---	54	10/59	---	---	---	---	---	165
85	27	5	---	50	4/42	7	---	---	---	---	166
125	42	6	---	---	12/59	1	---	---	---	---	168
52	42	6	---	12	7/61	5	---	3	140	---	169
55	27	6	---	25	10/64	20	---	---	---	---	170
80	42	6	---	40	8/59	5	---	6	280	---	171
85	31	6	---	17	12/59	4	---	11	435	---	172
92	21	5	---	F	10/61	7	---	---	---	---	176
85	20	6	---	25	2/60	5	---	---	---	---	177
100	54	6	68;77;92	31	9/65	12	.45	4	140	7.6	180
147	22	6	---	42	7/65	5	---	7	260	---	181
73	---	6	---	13	9/65	---	---	---	---	---	182
243	180	6	---	140	---	5	---	9	330	---	183
142	130	6	135	30	8/58	10	---	2	65	---	184
110	110	6	---	42	11/65	5	---	3	110	---	186
70	27	6	42;58	20	8/65	15	.55	---	---	---	198
243	207	6	170	109	12/65	10	.3	---	---	---	200
197	167	6	190	50	3/66	20	---	---	---	---	201

TABLE 16.

Well location: Number	Well location: Lat-Long	Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Mf-202	4042-7723	Austin Snook	Gilbert R. Zechman	1961	H	660	V	Dmh/---
203	4040-7723	Jay Shawver	do.	1961	H	670	V	Don/ls
204	4039-7725	John Mapstone	---	1958	H	618	S	DSkt/ss
205	4039-7725	James Helter	Gilbert R. Zechman	---	H	580	V	DSkt/ls
206	4042-7724	Carl Snook	do.	1961	H	720	S	Doo/ls
207	4040-7723	Bradley Pennebaker	do.	1965	H	710	S	Dop/---
208	4040-7723	do.	do.	1961	H	710	S	Dop/ss
209	4038-7731	Harry Blyer	do.	---	H	690	S	Dop/ls
210	4040-7724	Grace Rager	do.	1965	H	620	V	Dm/sh
211	4040-7724	Beatrice Henery	do.	1965	H	617	S	Dm/sh
214	4040-7725	Russell Coates	Freed and Bell	1965	H	597	V	Dm/sh
216	4040-7726	Mrs. Wilt	do.	1965	H	865	S	Dmh/---
219	4041-7726	Wesley Wiser	---	1965	H	750	S	Don/---
220	4038-7728	Bustie Stine	Freed and Bell	1965	H	560	V	DSkt/ls
221	4043-7721	Clarence Ritter	do.	1965	H	655	V	Dmh/---
222	4043-7723	Warren Brower	do.	1965	H	710	S	Dmh/---
223	4040-7725	Orville Snook	do.	1965	H	615	V	Dm/sh
224	4040-7725	Charles Seize	do.	1965	H	640	V	Dm/sh
226	4039-7725	Daryl Fowler	do.	1965	H	600	S	DSkt/---
227	4040-7724	Ronald Weaver	do.	1965	H	740	V	Dm/---
228	4038-7729	James Schultz	do.	1965	H	640	S	Dm/---
229	4039-7726	Willis Jury	---	1960	U	600	V	DSkt/ls
232	4048-7743	Union Twp. Munic. Authority No. 1	---	---	P	1020	S	Or/---
233	4036-7746	Munic. Authority of Union Twp.	---	1954	P	1022	W	Or/---
234	4035-7734	Royal Dairy Co.	---	---	N	500	V	Swc/---
235	4023-7750	Methodist Training Camp	---	1938	P	600	V	Doo/---
236	4024-7752	Ted Boozel	James R. Miller	1978	H	760	S	Sbm/sh
237	4032-7746	J. Delamarter	Hubler Drilling & Pump Service	1978	H	1060	S	Or/---
238	4032-7746	R. Yoder	do.	1978	H	1150	S	Or/---
239	4034-7748	B. Treaster	do.	1978	H	1205	S	Or/ls
240	4036-7745	J. Weikle	do.	1978	H	1020	S	Or/---
241	4034-7747	D. Byler	Martin W. Shatzer	1978	H	940	V	Obf/ls
242	4034-7747	E. Byler	do.	1978	H	980	V	Ocn/ls
243	4032-7749	F. Hartzler	do.	1978	H	1070	S	Or/ls
244	4025-7749	R. Mahews	Hubler Drilling & Pump Service	1978	H	760	S	Dh/---
245	4025-7748	B. Reed	do.	1978	H	690	V	Doo/ls
246	4025-7748	H. Wilson	do.	1978	H	800	H	Oh/ls
247	4029-7747	C. Heckman	do.	1978	H	800	V	Doo/ls
248	4025-7748	O. Vaughan	do.	---	H	---	S	Doo/ls
249	4025-7745	B. Kauffman	do.	1978	H	615	S	Swc/---
250	4026-7744	Stephen Davis	Hubler Well Drilling Co.	1973	H	610	S	Swc/---
251	4041-7728	R. Wagner	Hubler Drilling & Pump Service	1978	H	675	S	Don/---
252	4040-7726	J. Edmiston	Hubler Well Drilling Co.	1978	H	680	S	Dm/---
253	4039-7727	J. Boyd	Hubler Drilling & Pump Service	1978	H	680	S	Dm/---
254	4039-7726	R. Borman	do.	1978	H	660	S	Dop/---
255	4040-7723	R. Walters	do.	1978	H	750	S	Dop/ls
256	4042-7724	R. Casner	do.	1978	H	805	H	Dmh/---
257	4042-7723	O. Snook	Freed and Bell	1979	S	700	H	Dmh/---
258	4041-7723	G. Smith	Hubler Drilling & Pump Service	1978	H	640	S	Dm/---
259	4038-7729	J. Kurtz	Freed and Bell	1979	H	600	S	Dm/---
260	4039-7728	P. Renninger	do.	1979	H	665	S	Dm/---
261	4039-7727	M. Wray	do.	1978	H	610	S	Dm/---
262	4040-7725	R. Shreffler	do.	1978	H	640	V	Dm/---
263	4043-7728	J. Hassinger	Hubler Drilling & Pump Service	1978	H	900	S	Or/ls
264	4041-7721	L. Bubb	do.	1978	H	745	V	DSkt/ls
265	4043-7721	H. Wright	Freed and Bell	1978	H	680	V	Dmh/---
266	4043-7722	G. Renninger	do.	1978	H	710	S	Dmh/---
267	4029-7744	McVeytown Bor. Authority	Harrisburg's Kohl Bros.	1977	P	650	S	Oh/---
268	4030-7744	do.	---	---	P	650	S	Doo/---
269	4030-7744	do.	---	---	U	640	S	Doo/---
270	4030-7744	McVeytown Bor.	---	1968	U	570	S	Doo/---
271	4030-7744	McVeytown Bor. Authority	---	---	---	640	S	Dh/---
272	4037-7740	J. Kauffman	Hubler Well Drilling Co.	1978	H	755	V	Obf/ls
273	4038-7740	J. Kauffman	do.	1978	H	780	S	Obf/ls
274	4039-7739	James Parson	Gilbert R. Zechman	1975	H	760	F	Oa/ls
275	4039-7741	J. Byler	Hubler Drilling & Pump Service	1978	H	900	S	Obf/ls
276	4029-7743	James Crozier	Hubler Well Drilling Co.	1972	H	602	S	Sc/---
277	4027-7743	Robert French	do.	1974	H	680	S	Swc/---
278	4029-7744	Idle Acres Camping	do.	1973	P	515	V	DSkt/---
279	4030-7744	D. Stimeley	Hubler Drilling & Pump Service	1978	H	640	S	DSkt/---
280	4028-7745	Rupert Russell	Hubler Well Drilling Co.	1972	H	600	S	Swc/---
281	4034-7735	W. Girose	Hubler Drilling & Pump Service	1978	H	514	V	Swc/---
282	4035-7736	J. Rishel	do.	1978	H	740	S	DSkt/sh
283	4036-7736	S. Crisswell	do.	1978	H	810	S	DSkt/---
284	4036-7736	C. Rhodes	do.	1978	H	635	S	DSkt/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
362	28	6	350	50	3/61	28	---	---	---	---	Mf-202
198	169	6	190	8	9/61	---	---	---	---	---	203
75	72	6	64	18	4/58	50	---	---	---	---	204
52	47	6	---	15	4/58	38	---	---	---	---	205
107	25	6	98	18	5/61	20	---	---	---	---	206
247	97	6	230	85	8/65	---	---	---	---	---	207
212	170	6	---	50	2/61	18	---	---	---	---	208
147	---	6	140	40	---	7	---	---	---	---	209
197	---	6	195	45	7/65	5	---	---	---	---	210
72	---	6	68	20	7/65	10	---	---	---	---	211
110	39	6	---	4	3/66	7	.90	---	340	---	214
81	27	6	64	17	4/65	---	---	---	---	---	216
61	58	6	---	38	3/66	10	.59	2	87	5.8	219
80	60	6	72	35	7/65	19	.75	---	---	---	220
50	8	6	32	12	8/65	30	---	---	---	---	221
70	25	6	62	16	9/65	---	---	---	---	---	222
80	41	6	67	13	10/65	20	.62	---	---	---	223
122	64	6	65;105	24	10/65	20	.57	---	---	---	224
96	81	6	85	40	12/65	---	---	---	---	---	226
123	38	6	65;90;120	25	12/65	25	1.1	---	---	---	227
120	21	6	45;90;115	15	12/65	8	---	---	---	---	228
61	---	6	---	5	4/66	40	2.6	7	210	7.3	229
85	---	8	---	---	---	30	---	6	---	7.2	232
175	---	6	---	14	---	20	.33	---	---	---	233
155	---	---	---	---	---	---	---	---	---	---	234
398	18	---	---	5	12/38	85	---	---	---	---	235
197	22	6	183	39	7/80	8	---	---	---	---	236
150	66	6	130;140	56	7/80	25	---	---	---	---	237
125	40	6	80;115	---	4/78	25	---	---	---	---	238
200	60	6	110;185	---	8/78	20	---	---	---	---	239
150	30	6	80;130	---	7/78	10	---	---	---	---	240
300	60	---	185;280	88	7/80	8	.04	11	480	7.15	241
300	60	---	---	26	7/80	5	.03	---	---	---	242
100	60	---	---	33	7/80	12	.24	---	---	---	243
100	40	6	85	---	8/78	10	---	---	---	---	244
275	95	6	150;250	77	7/80	7	---	4	145	7.05	245
200	39	6	110;130;190	---	12/78	30	---	5	210	6.90	246
175	118	6	160	---	9/78	10	---	---	---	---	247
275	262	6	270	---	9/78	15	---	---	---	---	248
225	60	6	150;200	---	11/78	25	---	---	---	---	249
75	54	6	---	---	6/73	10	---	4	145	---	250
75	35	6	60	15	5/80	10	---	13	435	---	251
70	21	6	45;65	6	5/80	30	---	---	---	---	252
100	40	6	90	---	9/78	15	---	---	---	---	253
150	75	6	141	---	9/78	10	---	8	405	---	254
260	251	6	255	116	5/80	20	---	3	140	---	255
175	34	6	160	---	8/78	20	---	---	---	---	256
140	50	6	69;94;128	53	5/80	44	1.5	---	---	---	257
150	40	6	102;140	---	4/78	40	---	---	---	---	258
100	32	6	38;86	92	9/79	33	---	---	---	---	259
120	31	6	54;92;110	108	5/79	30	---	---	---	---	260
110	42	6	54;72;90	80	5/78	28	---	6	300	---	261
42	25	6	32	40	12/78	50	---	11	485	---	262
190	38	6	130;175	44	5/80	12	---	5	220	---	263
175	55	6	161	---	11/78	15	---	---	---	---	264
125	38	6	52;87;114	95	9/78	47	---	---	---	---	265
130	40	6	48;81;123	16	5/80	25	---	6	240	---	266
415	71	8	175;345;390;405	160	12/77	135	2.2	---	---	---	267
248	---	6	---	---	---	40	---	---	---	---	268
253	---	6	---	---	---	30	---	---	---	---	269
405	90	6	---	115	5/68	32	---	---	---	---	270
380	86	6	---	10	7/66	50	---	---	---	---	271
70	48	6	57	26	7/80	10	.50	19	605	---	272
90	33	6	50;80	54	7/80	10	.67	15	660	---	273
126	105	6	110;118	40	5/75	40	---	---	---	---	274
275	21	6	160;255	48	7/80	20	---	22	810	---	275
120	20	6	---	67	9/72	10	---	7	---	---	276
146	20	6	20	20	5/74	5	---	10	335	---	277
30	26	6	---	---	6/73	20	---	9	350	---	278
200	43	6	150;180	24	5/80	---	---	---	---	---	279
104	22	6	---	---	8/72	10	---	---	---	---	280
150	60	6	110;135	24	2/80	25	---	11	453	---	281
350	152	6	340	69	5/80	7	---	11	375	---	282
190	153	6	180	126	5/80	10	---	11	413	---	283
125	95	6	120	48	5/80	10	---	14	478	---	284

TABLE 16.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/lithology
Number	Lat-Long							
Mf-285	4036-7736	J. Markley	Hubler Drilling & Pump Service	1978	H	623	S	Swc/---
286	4035-7736	D. Shifflit	do.	1978	H	700	S	DSkt/---
287	4035-7736	Bakos	do.	1979	H	709	S	DSkt/---
288	4036-7736	J. Frank	do.	1978	H	885	S	Doo/---
289	4036-7736	H. Kline	do.	1978	H	828	S	Don/---
290	4036-7734	K. Weston	do.	1978	H	820	H	Don/---
291	4037-7731	J. Bloom	Freed and Bell	1979	H	722	V	Dh/---
292	4037-7732	Mildred Specht	do.	1979	H	800	V	Dh/---
293	4037-7730	N. Kratzer	do.	1978	H	590	S	DSkt/---
294	4038-7729	T. Wise	do.	1979	H	620	S	Dm/---
295	4037-7733	L. Bucanno	Hubler Drilling & Pump Service	1978	H	580	S	Swc/---
296	4038-7732	M. Filson	Gilbert R. Zechman	1979	H	620	S	DSkt/---
297	4037-7735	M. Hughes	Freed and Bell	1979	H	580	S	Swc/---
298	4038-7735	E. Espigh	Hubler Well Drilling Co.	1978	H	680	S	Swc/---
299	4038-7734	B. Laird	Hubler Drilling & Pump Service	1978	H	680	H	Swc/---
300	4040-7735	Harvey Maben	Gilbert R. Zechman	1973	H	590	V	Or/---
301	4034-7741	Carl Royer	Hubler Drilling & Pump Service	1978	H	780	S	Sc/---
302	4034-7740	J. D'Andrea	do.	1978	H	655	V	DSkt/---
303	4031-7741	L. Yoder	do.	1978	H	535	V	Sc/---
304	4031-7739	L. Hopple	James R. Miller	1978	H	560	V	Sbm/sh
305	4034-7737	J. Hollis	Hubler Drilling & Pump Service	1978	H	670	S	DSkt/ls
306	4031-7741	J. Miller	Hubler Well Drilling Co.	1979	H	670	S	Sc/---
307	4037-7744	D. Hostetter	Gilbert R. Zechman	1971	H	940	V	Ocn/sh
308	4036-7745	Metz Farms Inc.	Hubler Well Drilling Co.	1979	S	950	S	Ocn/---
309	4030-7747	B. Knable	do.	1979	H	860	S	DSkt/---
310	4030-7746	Clair Dunmire	do.	1973	H	840	V	DSkt/ls
311	4036-7742	Samuel Yoder	Gilbert R. Zechman	1974	H	840	F	Obf/ls
312	4030-7741	William Staykook	Hubler Well Drilling Co.	1974	H	500	V	Swc/---
313	4030-7740	Randy Laughlin	do.	1973	H	640	S	Sbm/ss
314	4032-7737	T. White	Hubler Drilling & Pump Service	1978	H	680	H	Sbm/ls
316	4036-7746	Munic. Authority of Union Twp.	---	1964	U	1080	W	Or/---
317	4023-7751	Mount Tyrol Water Co.	---	---	U	680	W	Dh/---
318	4023-7750	do.	---	---	U	610	W	Doo/---
326	4039-7735	Ed Reed	Hubler Well Drilling Co.	1974	H	720	S	Or/---
327	4039-7735	R. Brown	Gilbert R. Zechman	1979	H	680	S	Or/---
328	4039-7736	Mt. View Chapel	do.	1974	T	742	S	Obl/---
329	4041-7733	L. Goss	Hubler Drilling & Pump Service	1978	H	700	S	Obl/ls
330	4044-7730	M. Treaster	do.	1978	H	840	S	Ocn/---
332	4043-7736	G. Workinger	Gilbert R. Zechman	1978	H	895	S	Or/---
333	4041-7735	B. Moyer	Hubler Drilling & Pump Service	1978	H	820	V	Obe/ls
336	4045-7732	R. Baker	Hubler Well Drilling Co.	1979	H	1040	S	Or/ls
337	4045-7732	N. Speicher	Gilbert R. Zechman	1979	H	885	S	Ocn/---
338	4036-7743	Abbotts Dairies	---	1951	N	798	V	Obf/---
339	4036-7743	do.	---	1959	N	800	V	Obf/---
								PERRY
Re- 1	4027-7730	David George	---	---	H	735	H	Dck/---
5	4028-7707	Newport Ice Co.	Harrisburg's Kohl Bros.	1934	N	380	V	Dtr/---
6	4028-7708	Forged Steel Products Co.	---	---	N	420	V	Dtr/---
27	4039-7710	Robert Fosselman	---	---	H	480	S	Dck/ss
35	4028-7713	Earl Walker	---	---	H	500	V	Dck/sh
69	4027-7715	Harry Hoffman	---	---	H	530	V	Dck/---
77	4023-7701	Sunshine Hills Water Co.	---	---	P	510	S	Dciv/---
80	4033-7709	Millerstown Munic. Water	---	1943	P	410	V	Sc/---
81	4033-7709	do.	Hubler Well Drilling Co.	1960	P	760	W	Sc/---
87	4029-7712	B. R. Hubbard	Harrisburg's Kohl Bros.	1963	H	660	V	Dck/---
97	4026-7719	V. E. Delaney	Hubler Well Drilling Co.	1962	H	575	V	Dhb/---
101	4026-7713	L. V. Izer	G. R. Blosser	1964	H	550	V	Dtr/---
103	4024-7714	Mrs. M. Reader	do.	1964	H	795	S	Swc/sh
135	4023-7719	J. W. Myers	do.	1962	H	775	S	Dm/---
137	4024-7720	J. G. Stum	do.	1962	H	630	V	Dtr/---
149	4024-7720	R. F. Weller	do.	1960	H	640	V	Dhb/---
150	4024-7720	Mrs. Isenburg	do.	1960	H	650	S	Dmsr/---
164	4025-7725	Jacob Shuman	do.	1958	H	975	W	Sc/---
172	4026-7723	Frank Minum	do.	1957	H	720	V	Sm/---
176	4023-7720	H. Fuller	do.	1957	H	785	V	Dmo/---
187	4024-7720	Don Lightner	do.	---	H	630	V	Dtr/---
201	4024-7718	Dick Ulser	do.	1957	H	710	V	Dmsr/---
234	4026-7722	C. F. Reisinger	Joe Cekovich	1965	C	745	H	Sb/---
235	4026-7722	do.	Hubler Well Drilling Co.	1965	H	720	H	Sb/---
236	4026-7723	P. Stuber	do.	---	H	750	S	Sw/---
240	4025-7723	C. H. Swartz	Lininger Drilling & Pumps	1947	H	790	S	Don/---
241	4025-7723	do.	Hubler Well Drilling Co.	1959	U	790	S	Don/---
244	4026-7719	J. M. Delaney	do.	1965	H	575	V	Dhb/---
249	4024-7716	John Stambaugh	Harrisburg's Kohl Bros.	1959	S	770	H	Sto/---
255	4024-7716	H. R. Radle	Joe Cekovich	1965	H	825	H	Dmo/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
150	40	6	110;138	---	5/80	15	---	---	---	---	Mf-285
200	155	6	197	---	11/78	15	---	---	---	---	286
190	75	6	110;170	---	4/79	10	---	---	---	---	287
200	192	6	198	118	5/80	25	---	---	---	---	288
275	260	6	270	157	5/80	20	---	---	---	---	289
200	85	6	110;187	20	5/80	7	---	---	---	---	290
95	41	6	52;78	10	5/80	33	1.8	3	169	---	291
150	80	6	94;138	16	5/80	23	.24	6	257	---	292
240	111	6	147;191;225	71	8/80	16	.16	9	265	---	293
120	24	6	31;70;112	120	10/79	28	.87	---	---	---	294
200	160	6	187	---	11/78	8	---	---	---	---	295
151	132	6	142	30	4/79	25	---	---	---	---	296
150	42	6	64;91;130	26	8/80	35	1.5	14	595	---	297
180	21	6	70;150	110	8/78	5	---	15	510	---	298
200	40	6	185	90	8/80	10	---	---	---	---	299
126	40	6	43;92;114	10	8/73	6	---	18	805	7.02	300
300	70	6	270	32	8/80	3	---	4	195	---	301
75	30	6	60	19	8/80	15	---	10	430	---	302
200	51	6	150;180	43	8/80	12	---	4	290	---	303
190	20	6	65;125	---	1/78	3	---	---	---	---	304
125	100	6	115	F	6/78	18	---	---	---	---	305
180	20	6	95;175	180	8/79	15	---	---	---	---	306
167	37	6	40;120;140	---	8/71	5	---	---	---	---	307
95	25	6	50;85	2	8/80	25	---	---	---	---	308
70	40	6	50;60	11	8/80	20	---	8	290	---	309
136	60	6	---	---	4/73	8	---	---	---	---	310
251	42	6	125;230;290	65	8/74	40	---	---	---	---	311
130	40	6	70;105	40	4/74	15	1.5	---	---	---	312
85	60	6	---	---	4/73	5	---	---	---	---	313
300	77	6	210;185	---	1/78	12	---	---	---	---	314
300	23	6	45;60;94; 115	7	9/64	37	---	---	---	---	316
400	---	6	---	---	---	128	---	---	---	---	317
278	---	6	---	---	---	20	---	---	---	---	318
120	82	6	78;105	60	2/74	15	---	---	---	---	326
151	63	6	70;115;140	---	11/79	7	---	---	---	---	327
226	42	6	190;215	---	8/74	6	---	---	---	---	328
100	20	6	80;95	---	8/78	15	---	---	---	---	329
240	46	6	104;170	---	5/78	---	---	---	---	---	330
101	43	6	72;95	F	8/80	25	---	---	---	---	332
320	100	6	300;315	---	12/78	10	---	---	---	---	333
160	20	6	65;150	22	8/80	10	---	4	205	7.05	336
290	40	6	115;215;240	60	3/79	6	---	---	---	---	337
200	---	10	---	100	---	350	---	---	---	---	338
475	---	10	---	---	---	500	---	---	---	---	339
COUNTY											
90	20	6	---	25	---	3	---	---	---	---	Pe- 1
300	25	8	---	25	---	100	1	---	---	---	5
270	---	6	---	45	---	85	---	---	---	---	6
140	20	6	---	40	---	5	---	---	---	---	27
115	12	6	---	10	---	3	---	---	---	---	35
70	16	6	---	8	---	20	1.7	---	---	---	69
215	28	6	---	53	---	55	---	---	---	7.3	77
290	40	6	---	---	1943	15	---	---	---	---	80
200	40	6	---	---	1960	20	---	---	---	7.6	81
287	41	6	---	6	12/63	2	---	---	---	---	87
53	27	6	---	8	1962	10	---	6	260	7.7	97
94	44	6	---	27	7/64	6	---	---	---	---	101
90	56	6	57;86	42	5/64	15	---	---	---	---	103
32	14	6	18	3	5/62	15	---	9	390	7.6	135
45	17	6	41	---	6/62	10	---	5	210	7.3	137
57	19	6	24;56	F	---	7	1	---	---	---	149
59	18	6	15;57	F	4/60	8	1	---	---	---	150
50	21	6	48	20	9/58	15	1.0	4	170	---	164
95	15	6	90	15	6/57	5	---	3	450	---	172
53	21	6	30;50	18	7/57	10	---	2	150	5.3	176
52	16	6	48	F	12/57	7	---	---	---	---	187
73	18	6	25;68	5	8/57	20	.45	---	---	---	201
225	23	6	225	35	3/65	8	---	11	435	---	234
165	20	6	---	45	8/65	1	.1	8	340	6.7	235
60	16	6	45;58	5	12/61	16	---	5	---	---	236
235	52	6	230	126	1947	20	---	9	315	---	240
275	50	6	---	115	8/65	1	.1	---	---	---	241
48	---	6	---	6	7/65	15	.55	6	255	7.2	244
300	45	6	---	30	7/65	20	---	23	910	6.7	249
123	30	6	---	31	7/65	15	.31	2	110	6.0	255

TABLE 16.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Pe-261	4028-7716	K. S. Knisely	Earl Walker	1940	H	745	H	Dtr/ss
263	4029-7715	R. R. McNaughton	Lininger Drilling & Pumps	1943	H	690	V	Dhb/---
264	4028-7716	C. E. Burd	do.	1938	H	690	H	Dtr/---
272	4026-7719	C. A. Knouse	Hubler Well Drilling Co.	1965	H	580	V	Dmsr/sh
273	4027-7718	Mrs. George Long	Jack T. Walker	1962	H	590	H	Dmsr/---
276	4027-7716	K. R. Stone	G. R. Blosser	1951	H	575	W	Dtr/---
277	4027-7718	C. W. Newlin	Joe Cekovich	1965	H	580	W	Dmsr/sh
278	4028-7717	Mrs. Edward Paden	Lininger Drilling & Pumps	1948	H	625	S	Dmsr/---
279	4028-7717	M. A. Metz	Paul T. Shiffer	1960	H	650	W	Dmsr/---
281	4028-7716	C. Shotsberger	Hubler Well Drilling Co.	1960	H	710	S	Dmsr/---
282	4025-7715	J. A. Corman	Paul T. Shiffer	1965	H	700	S	Dmsr/---
283	4025-7716	S. G. Wrick	Earl Walker	1957	H	695	V	Dhb/sh
284	4026-7717	G. H. Haas	---	---	H	830	S	Dciv/---
285	4027-7718	P. G. Reisinger	Jack T. Walker	1962	H	570	V	Dhb/---
288	4027-7717	W. E. Britcher	Lininger Drilling & Pumps	1945	H	600	S	Dhb/---
290	4027-7719	J. Campbell	---	1959	H	750	W	Sto/---
297	4026-7718	Mrs. Ralph Jacobs	---	---	H	635	V	Dtr/---
298	4026-7717	Ralph Brinton	Lininger Drilling & Pumps	1963	S	825	W	Dtr/---
305	4027-7721	Ted Shiffer	Jack T. Walker	1958	H	625	V	Sto/ls
307	4024-7727	M. L. Sheaffer	Joe Cekovich	1964	H	1055	S	Sc/---
308	4024-7727	do.	do.	1965	H	995	S	Sc/---
309	4024-7727	Lindsay Depaw	do.	1964	H	970	S	Sc/sh
310	4024-7727	Edward Bichart	do.	1964	H	940	S	Sc/---
311	4024-7727	M. L. Sheaffer	do.	1964	H	1005	S	Sc/---
312	4024-7727	do.	do.	1965	H	1020	S	Sc/---
313	4024-7727	Truman Sminkey	do.	---	H	980	S	Sc/---
314	4024-7726	A. Mesemer	do.	1964	H	1020	S	Sc/---
315	4024-7726	Joseph Sweeney	---	1964	H	1020	S	Sc/---
316	4024-7726	Dr. K. W. Worley	Joe Cekovich	---	H	950	S	Sc/---
319	4029-7716	Burt Hahn	Hubler Well Drilling Co.	---	H	645	W	Dmo/---
320	4029-7716	George Schlitzer	---	---	H	655	W	Dmo/---
323	4029-7717	Charles Rathfon	Hubler Well Drilling Co.	---	H	1020	S	Dmo/---
324	4029-7716	Merle Lehmer	do.	---	H	910	W	Dmo/---
327	4029-7716	Laross Johnson	do.	---	H	950	S	Dmsr/---
328	4029-7716	George Brinton	do.	---	H	1000	S	Dmo/---
329	4029-7716	Frank Jones	do.	---	H	1010	S	Dmo/---
332	4029-7717	M. L. Lauver	do.	---	H	870	S	Dmo/---
333	4029-7717	G. A. Nulf	do.	---	H	930	S	Dmo/---
334	4029-7717	M. L. Lauver	do.	---	H	810	S	Dmo/---
335	4029-7717	George Weiser	do.	---	H	975	S	Dmo/---
336	4029-7717	C. K. Baumbach	do.	---	H	985	S	Dmo/---
338	4025-7716	J. A. Peck	do.	1964	H	705	S	Dcsc/---
339	4024-7716	W. B. Reisinger	Shiffer Brothers	---	H	830	S	Dmo/---
340	4027-7721	O. R. Johnson	Lininger Drilling & Pumps	1955	H	640	V	Sto/---
341	4027-7720	O. S. Sheriff	Earl Walker	1930	H	620	V	Swc/---
350	4027-7720	S. R. Sheriff	Lininger Drilling & Pumps	1953	H	630	V	Swc/ls
354	4027-7715	Walnut Grove Ch.	do.	---	T	530	V	Dck/---
356	4027-7721	Reformed Ch.	do.	---	T	640	V	Swc/ls
358	4027-7721	Stan Shiffert	do.	---	H	630	V	Swc/---
359	4027-7721	Ickesburg Hotel	Earl Walker	---	C	630	V	Sto/ls
361	4027-7721	Jesse Smith	Lininger Drilling & Pumps	1950	H	640	V	Swc/---
364	4027-7718	Sheaffer	do.	---	H	595	V	Dmsr/---
367	4027-7718	Eshcol Sch.	do.	---	H	585	S	Dmsr/---
368	4025-7717	Dale Haas	do.	---	H	800	S	Dmsr/---
369	4024-7717	Marlin Rudy	do.	---	H	765	S	Dmsr/---
370	4028-7707	Newport Bor. Water Authority	Harrisburg's Kohl Bros.	1966	P	385	V	Dtr/---
371	4028-7708	Newport Water Co.	Gilbert R. Zechman	1962	P	450	S	Dck/---
372	4025-7716	Russell Cristman	Joe Cekovich	1964	H	920	H	Dmo/---
373	4025-7715	H. R. Radle	Lininger Drilling & Pumps	1945	H	850	S	Dmo/---
384	4028-7709	J. R. Smith	Harrisburg's Kohl Bros.	1964	H	750	H	Dciv/ss
385	4028-7710	W. H. Magill	do.	---	H	700	H	Dciv/ss
387	4028-7708	Lester Witmyer	do.	1965	H	510	S	Dck/---
401	4027-7711	Clyde Smith	G. R. Blosser	1965	H	750	H	Dciv/---
404	4027-7721	Larry Rice	John Thran	1966	H	650	V	Sto/---
407	4024-7716	Harry Radle	Joe Cekovich	---	H	825	S	Dmo/---
408	4024-7716	do.	do.	1966	H	840	S	Don/---
414	4028-7720	Charles Barnes	Lininger Drilling & Pumps	---	H	715	S	Swc/---
415	4028-7720	do.	---	1964	U	890	S	Sb/---
417	4027-7721	Fred Rice	Hubler Well Drilling Co.	1966	H	650	S	Swc/---
419	4024-7726	George Lombard	---	1964	H	1155	H	St/---
420	4024-7726	Robert Gentzler	Joe Cekovich	1964	H	1155	H	St/---
424	4023-7721	David Hess	do.	---	H	915	S	Dmo/---
446	4029-7717	Albert Verdekal	---	1966	H	815	S	Dmo/---
450	4024-7720	Glen Clouse	G. R. Blosser	1966	H	650	V	Dhb/---
463	4024-7726	Harry Hartsough	---	1966	H	1130	S	St/---
500	4027-7721	L. W. Lacy	Earl Walker	1930	H	640	V	Sto/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
100	---	---	---	---	---	9	---	4	300	7.05	Pe-261
42	14	6	---	0	---	20	---	4	220	6.7	263
55	---	---	---	16	8/65	---	---	4	240	6.9	264
60	18	6	---	30	7/65	12	---	4	193	7.1	272
187	---	---	---	---	8/65	12	---	---	---	---	273
70	25	---	---	20	1951	7	---	3	160	7.1	276
140	20	6	100;140	F	8/65	6	.2	4	210	7.4	277
54	28	6	---	10	8/65	20	---	5	220	6.7	278
104	80	6	---	10	1960	12	---	3	170	6.5	279
60	16	6	---	5	4/60	35	---	---	---	---	281
70	25	6	---	8	7/65	10	---	4	200	7.3	282
80	18	6	---	---	---	18	---	4	200	7.1	283
77	---	6	---	22	7/65	3	---	5	245	6.5	284
60	---	---	40;60	F	---	40	---	---	---	---	285
87	20	6	---	20	1945	---	---	---	---	---	288
208	80	6	80	25	1964	8	---	---	---	---	290
68	---	---	---	---	---	21	---	3	280	7.3	297
350	25	6	---	41	8/65	10	---	---	---	---	298
211	18	6	---	6	7/58	9	---	24	860	7.1	305
139	68	6	---	26	8/65	10	.13	5	210	---	307
73	48	6	---	25	1/65	12	---	---	---	---	308
117	43	6	---	15	5/64	25	---	4	160	---	309
92	67	6	---	10	5/64	20	---	---	---	---	310
117	67	6	---	20	5/64	10	---	---	---	---	311
160	67	6	---	35	1/65	4	---	---	---	---	312
142	67	6	---	---	7/64	3	---	---	---	---	313
92	62	6	---	---	---	12	---	---	---	---	314
125	63	6	---	---	---	10	---	---	---	---	315
90	45	6	---	20	10/64	35	---	---	---	---	316
72	20	6	---	F	---	10	---	---	---	---	319
65	20	6	---	---	---	7	---	---	---	---	320
200	---	6	---	125	---	3	---	---	---	---	323
75	20	6	---	F	---	15	---	4	160	---	324
150	20	6	---	70	---	4	---	---	---	---	327
100	20	6	---	30	---	5	---	---	---	---	328
114	20	6	---	35	---	5	---	1	65	---	329
170	20	6	---	85	---	3	---	---	---	---	332
170	20	6	---	73	---	3	---	1	55	---	333
125	20	6	---	55	---	5	---	---	---	---	334
200	---	6	---	125	---	3	---	4	185	---	335
200	20	6	---	160	---	2	---	---	---	---	336
81	---	6	---	15	7/65	1	.01	4	180	7.6	338
80	30	6	---	30	7/65	15	---	---	---	---	339
68	41	6	---	7	---	100	---	---	---	---	340
49	---	6	---	15	8/65	---	---	15	492	---	341
78	26	6	63;75	---	8/65	20	---	27	1200	7.0	350
50	22	6	---	---	---	20	---	---	---	---	354
67	20	6	---	---	---	16	---	---	---	---	356
72	39	6	---	---	---	30	---	---	---	---	358
100	28	6	---	---	---	50	---	17	678	---	359
81	25	6	---	---	---	30	---	---	---	---	361
52	23	6	---	---	---	50	---	---	---	---	364
32	24	6	---	---	---	8	---	---	---	---	367
72	14	6	---	---	---	16	---	---	---	---	368
57	26	6	---	---	---	11	---	---	---	---	369
350	47	8	54;67	24	---	75	---	---	---	---	370
652	32	8	---	F	10/62	50	.12	---	---	---	371
225	40	6	200;225	121	7/65	8	---	2	130	6.0	372
98	40	6	---	50	---	18	---	---	---	---	373
170	33	6	---	25	11/64	6	---	---	---	---	384
118	24	6	110	10	11/64	60	---	---	---	---	385
197	31	6	135;190	65	2/65	30	---	---	---	---	387
152	48	6	32;60;125; 140	3	10/65	1	---	---	---	---	401
58	---	6	---	30	4/66	10	.84	8	260	7.2	404
97	45	6	---	5	4/66	12	---	---	---	---	407
95	40	6	60	44	4/66	25	2.5	4	140	6.6	408
162	20	6	---	---	---	8	---	---	---	---	414
120	20	6	---	34	1964	< 5	.1	3	105	---	415
81	40	6	---	24	5/66	12	1.6	5	230	7.5	417
67	41	6	---	---	---	2	---	---	---	---	419
122	22	6	---	60	1964	10	---	2	90	---	420
125	34	6	50;110;118	36	6/66	20	.3	5	230	---	424
146	---	6	---	80	8/66	---	---	---	---	---	446
52	27	6	18;46	6	8/66	7	.3	4	185	---	450
62	21	6	---	38	11/66	2	---	1	40	---	463
43	20	6	---	7	1966	---	---	17	685	---	500

TABLE 16.

Well location						Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ lithology
Number	Lat-Long	Owner	Driller	Date completed	Use			
Pe-505	4025-7710	Pa. Power and Light Co.	Joe Cekovich	1965	N	678	V	Sto/---
507	4028-7707	Snap-On Tools	---	1947	N	400	V	Dck/---
525	4028-7709	John Frank	Harrisburg's Kohl Bros.	1964	H	619	S	Dck/---
526	4028-7709	do.	do.	1964	H	603	S	Dck/---
550	4025-7713	C. Robinson	Gary L. Stone	1979	H	750	S	Sto/---
557	4024-7714	David Weller	Leon K. Sunday	1980	H	780	V	Dmh/sh
559	4028-7711	W. Cramer	Gary L. Stone	1978	H	620	S	Dck/---
560	4026-7714	Daryl Fowler	do.	1977	H	840	H	Dck/sh
561	4028-7714	Darwin Yohn	---	1977	H	650	S	Dtr/ls
562	4029-7712	William Richelderaer	---	1977	H	705	H	Dck/sh
564	4025-7714	Pleasant Valley Ch. parsonage	Leon K. Sunday	1976	H	690	S	Don/ls
565	4032-7711	P. Duncan	Eichelberger Well Drilling, Inc.	1978	H	500	V	Swc/ls
566	4030-7714	Frank Swartz	Gary L. Stone	1976	H	560	V	Dm/sh
567	4031-7709	Ray Potter	do.	1977	H	700	H	Dtr/sh
569	4031-7706	Roger Musselman	do.	1979	H	640	H	Dck/---
570	4032-7707	Smith	Leon K. Sunday	1978	H	680	H	Dck/sh
572	4032-7705	Joseph Nazzaro	Eichelberger Well Drilling, Inc.	1978	H	645	S	Dck/sh
573	4032-7705	John Hetrick	Leon K. Sunday	1978	H	640	H	Dck/sh
601	4027-7711	Little Buffalo State Park	Harrisburg's Kohl Bros.	1970	P	510	W	Dha/---
602	4027-7710	do.	do.	1970	P	485	S	Dmh/---
610	4032-7709	Millerstown Munic. Water Works	do.	1966	P	528	V	Dmh/---
611	4027-7706	K. Darr	Leon K. Sunday	1978	H	773	S	Sto/---
612	4027-7705	S. Hammer	Gary L. Stone	1980	H	780	S	Sto/---
613	4027-7707	A. Toy	do.	1979	H	475	S	Dtr/---
615	4028-7657	Jeff Miller	do.	1977	H	538	S	Dciv/---
616	4030-7708	L. Hoover	do.	1979	---	520	S	Dck/---
617	4030-7708	J. Hover	do.	1978	S	570	S	Dck/---
618	4030-7708	J. Hoover	do.	1979	S	590	S	Dck/---
620	4031-7704	Bruce Gothal	Leon K. Sunday	1976	H	700	S	Dck/sh
621	4033-7704	Robert Buckley	---	1977	H	720	H	Dck/sh
622	4032-7706	Clyde Beaver	Leon K. Sunday	1979	H	790	S	Dtr/sh
623	4032-7707	John Hetrick	do.	1979	H	680	H	Dtr/sh
624	4030-7714	Franklin Benson	Gary L. Stone	1977	H	525	V	Dop/sh
630	4030-7713	Steve Britcher	Gary L. Stone	1977	H	520	S	Dop/---
631	4031-7714	Lawrence Stultz	Leon K. Sunday	1978	H	610	S	Sb/sh
634	4026-7709	Bob Campbell	Gary L. Stone	1976	H	650	H	Sto/ls
635	4029-7710	H. Stydingerplank	do.	1978	H	520	F	Dck/---
636	4028-7713	V. Leisure	do.	1979	H	540	S	Dck/---
637	4026-7711	Wilson Narehood	Leon K. Sunday	1977	H	800	S	Sto/---
638	4026-7710	L. Furry	R. L. Whisler	1979	H	850	H	DSk/ls
640	4029-7708	D. M. White	Gary L. Stone	1976	H	450	S	Dck/sh
641	4027-7712	Dan Martz	do.	1977	H	750	H	Dck/sh
642	4027-7713	Naylor	Leon K. Sunday	1979	H	710	S	Dck/sh
644	4025-7711	Barkley	do.	1977	H	860	S	Dop/ls
645	4027-7710	C. Bitting	Gary L. Stone	1978	H	570	H	Dck/---
646	4025-7702	John Shiffer, III	do.	1977	H	563	H	Dciv/---
647	4025-7703	P. Minsker	Harrisburg's Kohl Bros.	1977	H	562	S	Dck/---
648	4026-7704	Veletta Smee	Leon K. Sunday	1979	H	621	S	Dck/---
649	4026-7701	David Delter	Gary L. Stone	1975	H	407	S	Dciv/---
650	4027-7702	William Guntrum	do.	1976	H	460	S	Dha/---
651	4002-7727	Mahanoy Valley Nurseries	Eichelberger Well Drilling, Inc.	1979	H	532	H	Dciv/---
660	4026-7706	R. Miller	do.	1978	H	690	S	DSk/---
661	4024-7701	Sunshine Hills Water Co.	---	---	P	510	H	Dciv/---
662	4027-7708	Newport Bor. Water Authority	---	---	P	410	W	Dmh/---
663	4033-7709	Millerstown Munic. Water Works	---	1975	P	545	V	Swc/---
664	4027-7710	A. Voorees	Gary L. Stone	1980	H	740	H	Dck/---
665	4030-7708	J. Hoover	do.	1979	S	520	S	Dck/---
666	4029-7712	R. Colick	do.	1979	H	610	S	Dck/---
667	4030-7713	J. Gabert	do.	1980	H	660	S	Dtr/---
668	4031-7714	L. Weibley	do.	1979	H	580	S	Sb/---
669	4031-7706	W. Benson	do.	1979	H	605	S	Dck/---
671	4027-7707	R. Finton	do.	1977	H	460	V	Dtr/sh
672	4026-7714	J. Strader	do.	1978	H	860	H	Dck/---
673	4026-7714	E. McGeary	do.	1977	H	840	S	Dck/sh
674	4027-7710	Gary Gill	do.	1976	H	610	S	Dck/sh
675	4025-7713	D. McCluskey	Leon K. Sunday	1978	H	760	S	Dm/ss
								SNYDER
Sn- 76	4043-7720	Carl Kauffman	Freed & Bell	1961	H	750	V	Dtr/---
77	4043-7720	Harry Collabrine	do.	1961	H	715	H	Dmh/sh
79	4044-7720	Glen Berryman	do.	1960	H	780	S	Dmh/---
80	4043-7720	S. J. Gross	do.	1960	H	680	V	Dtr/---
93	4043-7720	D. C. Boonie	do.	1965	H	725	S	Dmh/---
106	4042-7721	Warren Ball	J. M. Hubler	1962	H	670	V	Dmh/---
112	4043-7721	Clifford Wagner	M. H. Romig	1962	H	720	H	Dmh/sh
120	4043-7720	Gerald Renninger	Freed & Bell	1964	H	700	V	Dmh/---
121	4043-7720	John Gross	do.	1966	H	680	S	Dtr/sh
122	4043-7720	James McClosky	do.	1965	H	720	S	Dmh/---
123	4043-7720	Arthur Baumgardner	do.	1965	H	740	S	Dtr/---

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gal/min)	Specific capacity ([gal/min]/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
176	70	6	70;106;140;158	40	12/65	40	1.5	---	---	---	Pe-505
255	---	6	---	95	---	30	.78	---	---	---	507
298	57	6	245;278	125	---	2	---	---	---	---	525
97	39	6	87;90	45	---	50	---	---	---	---	526
297	80	6	95;160	26	5/80	4	---	---	---	---	550
300	80	6	270;290	32	5/80	20	---	14	513	---	557
149	40	6	180;230	100	7/78	38	---	6	263	---	559
148	40	6	80;140	40	3/77	60	---	5	245	---	560
348	40	6	220	35	3/77	1	---	---	---	---	561
150	40	6	95;135;145	40	7/77	12	---	4	200	---	562
155	143	6	65;120	50	10/76	20	---	3	113	---	564
250	42	6	85;120;139;239	28	5/80	20	---	13	420	---	565
72	46	6	45;65	6	4/76	15	---	---	---	---	566
73	41	6	50;60	30	8/77	20	---	4	140	---	567
247	42	6	90;230	68	5/80	6	---	3	140	---	569
160	40	6	95;140	40	11/78	12	---	6	245	---	570
100	42	6	80	---	10/78	10	---	---	---	---	572
370	40	6	150;370	80	11/78	8	---	---	---	---	573
350	37	8	80;148;290	45	1/70	130	1.0	---	---	---	601
300	40	8	55;78;162	22	2/70	190	2.2	---	---	---	602
420	42	6	---	60	6/66	37	.19	---	---	---	610
200	102	6	120;150;170	60	6/78	10	---	---	---	---	611
123	60	6	110	30	2/80	40	---	---	---	---	612
348	40	6	90;335	F	5/80	5	---	---	---	---	613
123	40	6	110	28	5/80	40	---	5	268	---	615
448	---	6	---	---	7/79	0	---	---	---	---	616
373	42	6	230	120	2/78	8	---	---	---	---	617
372	42	6	175	95	7/79	1	---	---	---	---	618
255	60	6	110;220	40	7/76	5	---	---	---	---	620
100	30	6	60;99	35	8/77	25	---	2	115	---	621
155	41	6	125;145	50	5/79	10	---	2	85	---	622
160	62	6	135;150	50	10/79	12	---	3	140	---	623
72	48	6	60	5	7/77	60	---	---	---	---	624
120	40	6	65	19	5/80	12	---	8	460	---	630
100	42	6	80	6	5/80	30	---	4	235	---	631
173	84	6	160	80	11/76	9	---	---	---	---	634
198	40	6	160;190	20	7/78	20	---	---	---	---	635
422	42	6	180;400	46	5/80	15	---	1	330	---	636
195	157	6	170;190	80	8/77	30	---	---	---	---	637
199	194	6	196	70	4/79	30	---	---	---	---	638
247	40	6	160;240	60	9/76	7	---	---	---	---	640
223	59	6	150;210	29	5/80	25	---	6	300	---	641
140	40	6	100;130	40	8/79	15	---	---	---	---	642
500	105	6	460	100	8/77	5	---	8	350	---	644
323	43	6	280;310	82	5/80	6	---	---	---	---	645
224	42	6	160;220	35	7/77	9	---	2	96	---	646
200	42	6	105;185	80	5/80	6	---	4	210	---	647
120	60	6	80;115	30	6/79	30	---	3	167	---	648
122	42	6	60;110	15	12/75	10	---	---	---	---	649
148	40	6	80;130	50	5/80	20	---	3	137	---	650
205	---	6	---	---	6/79	12	---	3	147	---	651
125	81	6	88;98;116	---	4/78	45	---	---	---	---	660
---	41	6	---	69	6/64	95	1.7	---	---	---	661
210	42	8	95;100;125	2	2/75	250	5.9	---	---	---	662
400	61	8	---	25	8/75	300	2.3	---	---	---	663
198	40	6	120;180	20	5/80	12	---	---	120	---	664
372	42	6	180;300	---	7/79	5	---	---	---	---	665
348	41	---	160	25	10/79	3	---	---	---	---	666
98	40	6	70;85	20	4/80	20	---	---	---	---	667
123	79	6	110	25	12/79	25	---	---	---	---	668
148	40	6	125;140	75	5/79	40	---	---	---	---	669
247	41	6	140;145	20	11/77	10	---	---	---	---	671
173	40	6	130;160	68	5/80	10	---	4	240	---	672
247	48	6	140;220	66	5/80	12	---	1	260	---	673
373	64	6	120;340	110	6/76	5	---	---	---	---	674
160	151	6	155	50	9/78	20	---	---	---	---	675

COUNTY

50	21	6	40	2	9/65	8	.24	7	300	7.2	Sn- 76
110	30	6	65;90;105	40	7/61	15	0.2	6	245	6.8	77
95	36	6	42;91	21	5/60	7	0.1	---	---	---	79
100	26	6	61;89	29	4/60	10	0.14	---	---	---	80
100	17	6	65;80;95	30	---	15	1.4	---	---	---	93
44	21	6	---	4	4/62	10	---	3	160	6.2	106
94	24	6	---	66	9/62	---	---	6	310	5.9	112
100	28	6	---	41	11/64	7	0.1	6	260	6.9	120
100	16	6	75;90	12	2/66	25	1.9	---	---	---	121
85	50	6	68;75	10	6/65	25	.83	---	---	---	122
100	21	6	67;85	18	6/65	15	.38	---	---	---	123

TABLE 17. RECORD OF SPRINGS

ng location: The number that is assigned to identify the spring. It is prefixed by a two-letter abbreviation of the county. The latitude and longitude (lat-long) are the coordinates in degrees and minutes of the southeast corner of a 1-minute quadrangle within which the spring is located.

fer Mmc, Mauch Chunk Formation; Dck, Catskill Formation; Df, Foreknobs Formation; Dm, Marcellus Formation; Doo, Onondaga and Old Port Formations, undivided; Dor, Ridgeley Member of Old Port Formation; DSkm, Keyser Formation through Mifflintown Formation, undivided; Sto, Tonoloway Formation; Swc, Will Creek Formation; Sc, Clinton Group; Obe, Bald Eagle Formation; Or, Reedsville Formation; Obl, Benner Formation through Loysburg Formation, undivided; Ol, Loysburg Formation; Ob, Beekmantown Group; Obf, Bellefonte Formation; Oba, Bellefonte and Axemann Formations, undivided; Oa, Axeman Formation; On, Nittany Formation; €g, Gatesburg Formation.

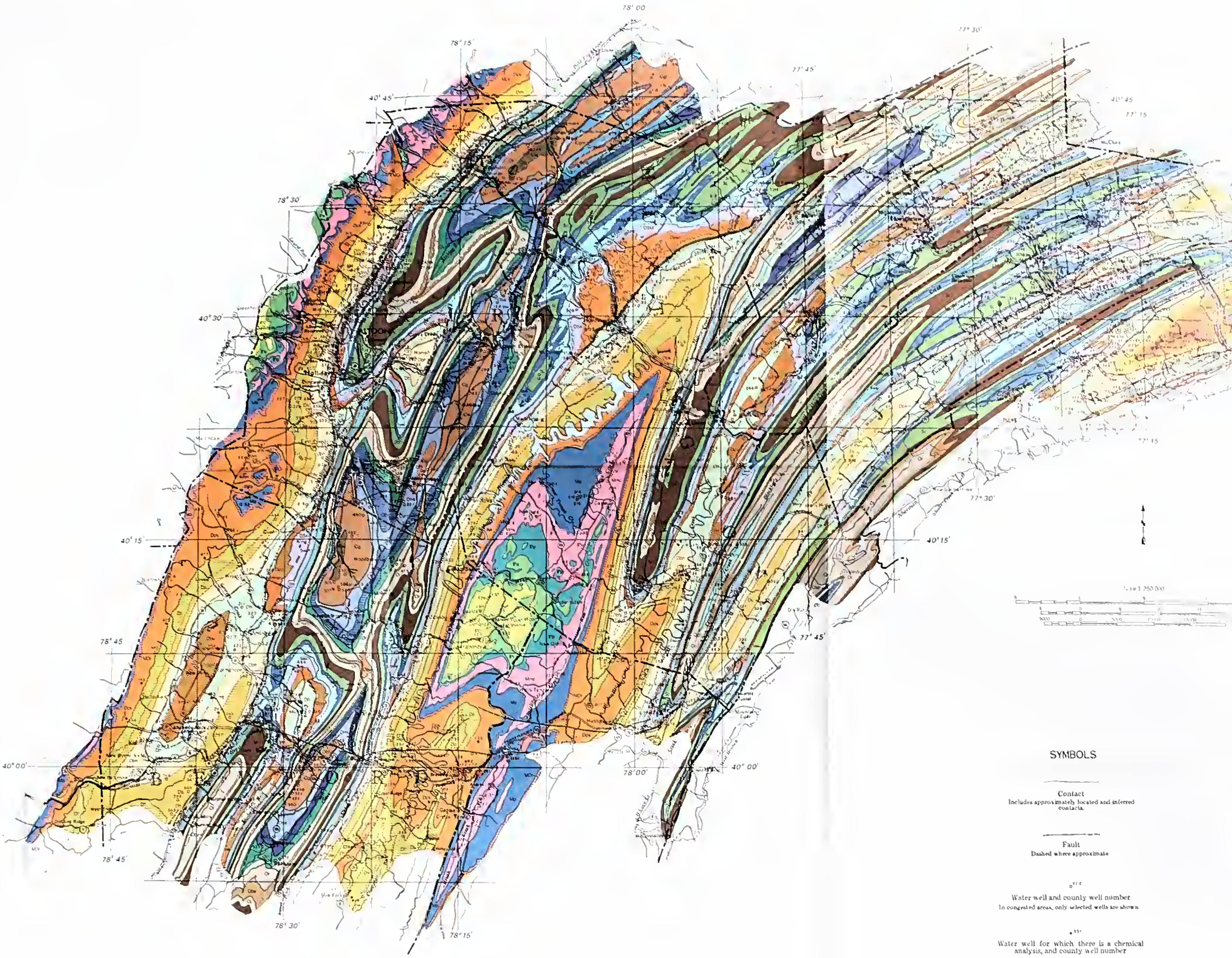
harge E, estimated; M, measured.

B, bottling; C, commercial; H, household; M, medicinal; N, industrial; P, public; R, recreation; S, stock; T, institutional; U, unused.

pring location		Owner (Spring name)	Altitude above sea level (feet)	Aquifer	Discharge (gal/min)	Date measured or estimated	Estimated discharge characteristics (gal/min)			Use	Temperature (°C)	Remarks
er	Lat-Long						Maximum	Median	Minimum			
		BEDFORD COUNTY										
1	4001-7844	(Unnamed spring)	1540	Df	---	---	---	---	---	S	14	Complete chemical analysis. Sampled 7-9-68.
2	4003-7843	E. Shafer, Jr.	1800	Dck	---	---	---	---	---	H	20	Complete chemical analysis. Sampled 7-9-68.
3	4001-7826	O. C. Hartley (Bubbling Spring)	1120	Ob	100 (E)	9-30-33	---	---	---	H	11	Partial chemical analysis. Two openings.
4	4009-7834	Reynoldsdale Hatchery (Spring Meadow Spring)	1125	Dor	1600 (M)	11-10-71	2000	1600	1200	N	11	Partial chemical analysis. Sampled 11-10-71.
5	3959-7830	Bedford Springs Hotel (Bedford Springs)	1100	Doo	100 (E)	---	---	---	---	---	11	Three openings.
6	3959-7830	Bedford Springs Hotel (Magnesium Spring)	1100	Doo	30 (E)	10-13-33	---	---	---	M	15	Partial chemical analysis.
7	3959-7830	Bedford Springs Hotel (Still House Spring)	1140	Doo	40 (E)	---	---	---	---	B	13	---
8	3958-7830	Bedford Springs Hotel (Black Spring)	1180	Doo	40 (E)	---	---	---	---	P	12	---
9	3957-7836	M. S. Colvin (White Sulphur Spring)	1360	Or	5 (E)	10-13-33	---	---	---	H	11	Hydrogen sulfide gas.
0	4002-7839	United Church of Christ (Living Water Spring)	1200	Doo	1310 (M)	11-11-71	---	1400	---	R	13	---
		BLAIR COUNTY										
1	4028-7816	Penn Central Railroad (Flowing Spring)	880	Sto	200 (E)	10-10-33	---	---	---	H	10	Ebbs and flows.
2	4027-7812	West Virginia Pulp and Paper Co. (Big Springs)	900	€g	3640 (M)	1908	---	---	---	---	---	Discharge is mean of 89 measurements.
					4150 (M)	1933	---	---	---	N	---	Measured by owner.
					2330 (M)	8-16-49	---	---	---	N	---	
					3710 (M)	11-10-71	9000	3700	1200	N	11	---
4	4039-7815	West Virginia Pulp and Paper Co. (Cold Spring)	910	DSkm	1500 (E)	1933	---	---	---	---	11	Reported to be contaminated.
					396 (M)	11-08-71	---	400	---	U	---	
5	4017-7826	General Refractories Co. (Weynant Spring)	1180	Sto	---	---	---	---	---	P	---	Large flow reported.
6	4016-7827	General Refractories Co. (Burket Stake Spring)	1180	Sto	100 (E)	---	---	---	---	P	---	---
7	4019-7824	Roaring Springs Blank Book Co. (Roaring Spring)	1200	On	5500 (M)	1908	---	---	---	N	---	Measured by owner.
					4680 (M)	7-03-44	---	---	---	N,P	11	Partial chemical analysis.
					4280 (M)	11-10-71	5600	4500	3500	N,P	---	
9	4025-7816	R. C. Hartman (Unnamed spring)	1110	Obf	250 (E)	---	---	---	---	H	11	---
0	4025-7816	Pa. Fish Comm.	1100	Obf	1500 (E)	10-33	---	---	---	H	11	Four openings.
					1410 (M)	11-10-71	---	1500	---	H	10	---
1	4036-7812	H. C. Means (Arch Spring)	905	Ol	2000 (E)	10-33	---	---	---	U	---	Much of high flow in Sinking Run enters ground at Tytoona Cave about 1 mile upstream of spring.
					7430 (M)	6-20-44	---	---	---	---	11	
					13500 (M)	11-09-71	30000	8000	---	U	10	
2	4040-7814	City of Tyrone (Big Spring)	905	Sto	415 (M)	6-23-44	---	---	---	---	10	Pumping of local wells is causing flow to diminish.
					104 (M)	11-09-71	---	100	---	U	11	
3	4024-7818	P. Good (Unnamed spring)	1290	Swc	10 (E)	6-19-80	---	---	---	U	11	---
4	4020-7832	R. Ritchey (Unnamed spring)	2320	Dck	10 (E)	6-19-80	---	---	---	U	8	Partial chemical analysis.
		CENTRE COUNTY										
7	4056-7731	Madisonburg Water Co.	1440	Or	---	---	---	---	---	P	---	---
4	4042-7758	Mr. Walker (Rock Spring)	1160	Obf	1000 (E)	7-16-34	---	---	---	H	11	Issues from a cave.
5	4043-7753	Ferguson Twp. Water Co.	1400	Obe	120 (E)	7-34	---	---	---	P	9	---
8	4045-7814	Oak Ridge Auth. (Able Spring)	1600	Dck	115	---	---	---	---	P	---	---

TABLE 17. (CONTINUED)

Spring location		Owner (Spring name)	Altitude above sea level (feet)	Aquifer	Discharge (gal/min)	Date measured or estimated	Estimated discharge characteristics (gal/min)			Use	Temperature (°C)	Remarks
Number	Lat-Long						Maximum	Median	Minimum			
					FULTON COUNTY							
Fu- 2	3956-7813	Crystal Spring Campground (Crystal Spring)	1200	Mmc	2 (E)	---	---	---	---	H	---	---
3	4006-7757	Paul Downin (Unnamed spring)	880	Doo	---	---	---	---	---	H	19	Chemical analysis Sampled 9-18-80.
4	4006-7757	Paul Downin (Unnamed spring)	738	Doo	---	---	---	---	---	U	14	---
					HUNTINGDON COUNTY							
Hu- 1	4039-7812	W. Va. Pulp & Paper Co. (Hundred Springs)	880	Obf	2800 (E)	8-33	---	---	---	N	---	Many openings.
2	4041-7801	Mrs. Elder (Double Spring)	1040	Ob	500 (E)	9-05-33	---	450	---	H	11	---
						11-08-71	---	---	---	H	10	---
4	4032-7758	Dr. A. Layne (Warm Spring)	655	Dor	750 (E)	9-11-37	---	---	---	U	18	---
					243 (M)	11-09-71	---	300	---	U	17	---
6	4029-7802	Commonwealth of Pa. (Mason Spring)	670	Dor	60 (E)	9-11-33	---	---	---	T	---	Partial chemical analysis.
8	4038-7811	Grier Water Works	1050	Єg	10 (E)	3-12-63	---	---	---	P	---	One of four springs.
9	4029-7801	Commonwealth of Pa. (Prices Spring)	630	Dor	585 (M)	12-05-32	---	---	---	T	---	---
					690 (M)	2-16-33	---	---	---	T	---	---
10	4017-7809	(Unnamed spring)	1070	Mmc	---	6-21-72	---	---	---	---	---	---
11	4038-7811	(Birmingham Cave Spring)	900	Єg	---	6-29-67	---	---	---	U	9	Partial chemical analysis.
12	4037-7807	(Spruce Creek Spring)	780	On	---	8-11-67	---	---	---	C	10	Partial chemical analysis. Used by fish hatchery.
13	4034-7809	(Tippery Cave Spring)	900	Oba	---	1-18-68	---	---	---	U	9	Partial chemical analysis.
14	4034-7809	(Near Tippery Spring)	900	Oba	---	5-15-67	---	---	---	U	9	Partial chemical analysis.
17	4032-7810	(Unnamed spring)	950	Єg	---	---	---	---	---	H	11	---
18	4016-7308	Mr. Lemin (Unnamed spring)	1360	Mmc	---	---	---	---	---	H	16	---
19	4016-7810	Mr. Edward Gates (Unnamed spring)	1260	Mmc	---	---	---	---	---	H	10	---
					JUNIATA COUNTY							
Ju- 1	4039-7717	McAlisterville Water Co.	1050	Sc	18 (E)	8-18-34	18	---	---	P	12	Partial chemical analysis.
					MIFFLIN COUNTY							
Mf- 1	4033-7746	Iddo W. Bender (Swarey Spring)	840	Obf	750 (E)	1934	---	---	---	H	11	---
					1130 (M)	11-11-71	---	1250	---	U	---	---
2	4039-7738	James Reed (Yoder Spring)	725	Oa	500 (E)	1934	---	---	---	H	11	---
					1230 (M)	11-08-71	---	1350	---	H	---	---
3	4041-7733	(Mammoth Spring at Alexander Cavern)	640	Obl	14600 (M)	11-11-71	---	14000	---	U	9	Measured discharg includes 2900 gal/min entering ground at sink 1000 feet NE of spring.
4	4045-7731	(Unnamed spring)	830	Or	107 (M)	11-16-71	---	100	---	U	11	
6	4032-7749	Allensville Mun. Water Auth.	1260	Or	300	4-06-55	---	---	---	P	---	Partial chemical analysis.
					PERRY COUNTY							
Pe- 4	4033-7709	Millerstown Mun. Water Auth.	389	Swc	35-40	4-19-61	---	---	---	P	---	Partial chemical analysis (4-19-61
6	4032-7708	Millerstown Bor.	560	Dm	15	8-27-34	---	---	---	P	---	---



SYMBOLS

Contact
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Water well and county well number
In congested areas, only selected wells are shown

Water well for which there is a chemical analysis, and county well number

Spring and county spring number

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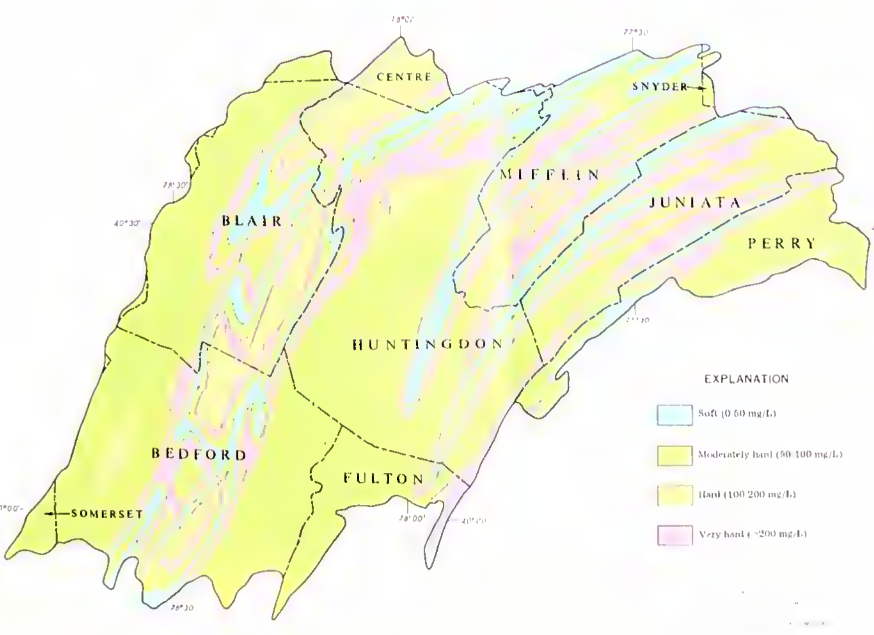

MEDIAN HARDNESS OF GROUNDWATER

GEOLOGIC MAP OF THE JUNIATA RIVER BASIN, SHOWING THE LOCATIONS OF WELLS AND

BY

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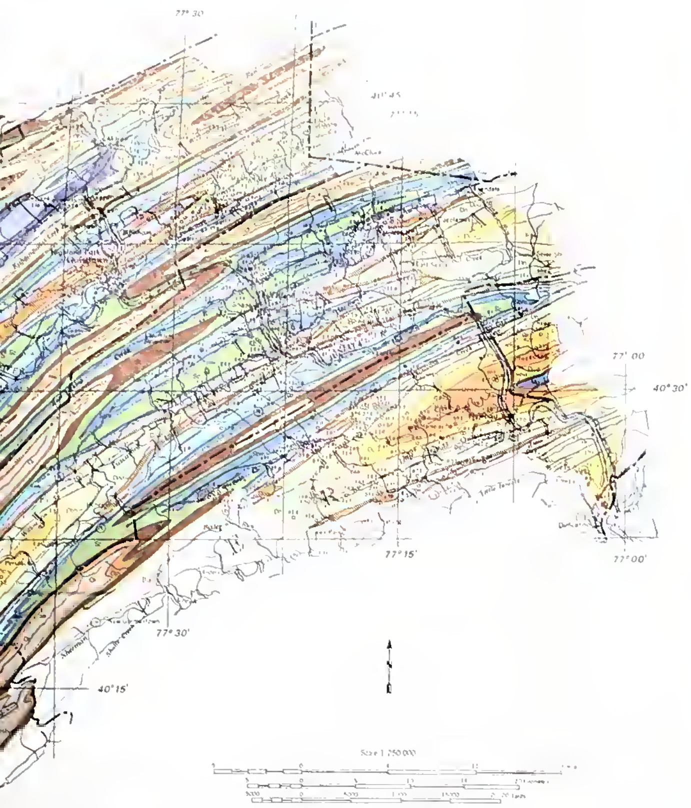
NANCY S. duPONT
MARY LOU KRIZ

1982



EXPLANATION

	UNIT	GEOLOGIC DESCRIPTION	WELL YIELDS	QUALITY OF WATER
PENNSYLVANIAN	CONEMAUGH GROUP ALLEGHENY GROUP POTTSVILLE GROUP	Primarily gray and black shale and claystone, gray and brown sandstone, and coal; sandstone increases in abundance toward the bottom of the stratigraphic section	Reported well yields range from 0 to 255 gal/min; the median for domestic wells is 3 gal/min; yields of two nondomestic wells in the Conemaugh Group average 26 gal/min, and two in the Pottsville Group average 170 gal/min.	Water is moderately hard; often contains high concentrations of iron, manganese, and sulfate.
MISSISSIPPIAN	MAUCH CHUNK FORMATION	Almost entirely red shale, some thin red and green sandstone around the Broad Top coal field, gray sandstone and minor amounts of red and green siltstone and mudstone along the Appalachian Plateau	Reported well yields range from 1 to 60 gal/min, the medians for domestic and nondomestic wells are 12 and 32 gal/min, respectively	Water is moderately soft and generally of good quality; high levels of iron and manganese are a frequent problem.
MISSISSIPPIAN	BURGOON SANDSTONE POCONO FORMATION ROCKWELL FORMATION SPECHTY KOPF FORMATION	Pocono Formation—Thick bedded sandstone and gray sandy shale, some beds of gray and red sandstone and red shale. Burgoon Sandstone—Predominantly quartzitic sandstones, conglomeratic quartzite occurs near the base and impure sandstone is present in the medial portion. Rockwell and Spechty Kopf Formations—Impure sandstone and subordinate siltstone and shale.	Reported well yields range from 2 to 118 gal/min, the median for domestic wells is 15 gal/min; yields of two nondomestic wells average 49 gal/min.	Water is moderately soft, high levels of iron and manganese are a problem in water from most wells.
DEVONIAN	CATSKILL FORMATION: DUNCANNON MEMBER SHERMAN CREEK MEMBER IRISH VALLEY MEMBER	Shale, mudstone, and some sandstone, approximately 80 to 85 percent of the unit is red in color, few sandstone strata exceed 50 feet in thickness and most are between 5 and 20 feet thick	Reported well yields range from 1 to 100 gal/min; the medians for domestic and nondomestic wells are 10 and 30 gal/min, respectively.	Water is moderately soft, about half the wells produce water high in iron and manganese.
DEVONIAN	FOREKNOBS FORMATION SCHERR FORMATION LOCK HAVEN FORMATION	Foreknobs Formation—Thin- to very thick bedded conglomerate, sandstone, siltstone, mudstone, and shale. Scherr Formation—Gray siltstone, shale, mudstone, and some sandstone. Lock Haven Formation—Predominantly siltstone with lesser amounts of sandstone, shale, and conglomerate.	Reported well yields range from 1 to 60 gal/min, the median yields of domestic wells are 10, 7, and 4 gal/min for the Foreknobs, Scherr, and Lock Haven Formations, respectively, four nondomestic wells in the Foreknobs have a median yield of 10 gal/min, and three in the Lock Haven have a median of 30 gal/min.	Water is moderately hard; more than half the wells produce water high in iron and manganese.
DEVONIAN	TRIMMERS ROCK FORMATION BRALLIER AND HARRELL FORMATIONS, UNDIVIDED	Trimmers Rock Formation—Gray and medium-gray siltstone and silty shale, a minor amount of interbedded very fine grained sandstone is present in the upper part. Brallier Formation—Interbedded shale, silty shale, and siltstone. Harrell Formation—Black shale (Burket Member) and dark gray shale	Reported well yields range from 1 to 130 gal/min, the median yields of domestic wells for the Trimmers Rock Formation and the Brallier and Harrell Formations combined are 10 and 6 gal/min, respectively, four nondomestic wells have a median yield of 80 gal/min.	Water is moderately hard, one third of the wells produce water high in iron and two thirds produce water high in manganese; excessive hydrogen sulfide is an occasional problem.
DEVONIAN	HAMILTON GROUP	Consists of the Mahantango Formation, including the Sherman Ridge and Montebello Members, and the Marcellus Formation. Mahantango Formation—Gray, brown, and olive siltstone; light-olive gray silty claystone (Sherman Ridge Member); and fine-grained siliceous sandstone (Montebello Member). Marcellus Formation—Very dark gray to black, fissile shale	Reported well yields range from 1 to 380 gal/min, the median yields for domestic and nondomestic wells are 12 and 38 gal/min, respectively.	Water is moderately hard; over half the wells produce water containing objectionable amounts of iron and manganese, and many produce water containing hydrogen sulfide.
DEVONIAN	ONONDAGA FORMATION OLD PORT FORMATION: RIDGELEY MEMBER SHRIVER THROUGH NEW CREEK MEMBERS, UNDIVIDED	Onondaga Formation—Interbedded dark gray limestone, shaly limestone, and calcareous and noncalcareous shale. Old Port Formation—Composed of two units: a lower unit (Dosn) consisting of chert, cherty limestone and calcareous shale, and an upper calcareous quartz sandstone unit (Dor).	Reported well yields range from 0 to 1,400 gal/min, the medians for domestic and nondomestic wells are 10 and 66 gal/min, respectively.	Water is moderately hard, about one fourth of the wells produce water high in iron
SILURIAN	KEYSER AND TONOLOWAY FORMATIONS, UNDIVIDED	Keyser Formation—Consists of an upper, mainly laminated, sequence of limestones and a basal, nodular limestone; middle part is sometimes arenaceous and cherty. Tonoloway Formation—Medium gray, very thin to thick-bedded, laminated limestone and argillaceous limestone; small amount of shale sometimes occurs as interbeds.	Reported well yields range from 0 to 315 gal/min, the median yield for domestic wells is 10 gal/min and the median for nondomestic wells is 33 gal/min.	Water is very hard and moderately high in dissolved solids.
SILURIAN	WILLS CREEK FORMATION	Interbedded olive- and greenish-gray calcareous and noncalcareous shale and argillaceous limestone, also a few interbeds of grayish-red shale and gray, fine-grained sandstone.	Reported well yields range from 1 to 360 gal/min; the medians for domestic and nondomestic wells are 15 and 40 gal/min, respectively.	Water is hard to very hard; about 20 percent of the wells produce water high in iron.
SILURIAN	BLOOMSBURG AND MIFFLINTOWN FORMATIONS, UNDIVIDED	Bloomsburg Formation—Grayish-red shale and mudstone and some interbeds of light-gray sandstone and limestone. Mifflintown Formation—Dark-gray calcareous shale having many interbedded thin layers of limestone, some red siltstone is present near base of unit.	Reported well yields range from 1 to 150 gal/min; the medians for domestic and nondomestic wells are 15 and 18 gal/min, respectively.	Water is moderately hard and comparatively low in dissolved solids.
SILURIAN	CLINTON GROUP	Light-gray and light-olive-gray shale and some minor interbedded siltstone and sandstone, one or more grayish-red to reddish-black, hematitic sandstone or siltstone horizons are generally present.	Reported well yields range from 1 to 386 gal/min; the medians for domestic and nondomestic wells are 10 and 20 gal/min, respectively	Water is moderately hard and comparatively low in dissolved solids; most wells produce water high in iron and manganese.
SILURIAN / ORDOVICIAN	TUSCARORA FORMATION JUNIATA FORMATION BALD EAGLE FORMATION	Tuscarora Formation—Light- to medium gray sandstone and minor interbedded shale. Juniata Formation—Brownish- to grayish red sandstone and some siltstone and shale. Bald Eagle Formation—Gray to olive-gray and grayish-red, fine- to coarse-grained sandstone and some conglomerate.	Limited data; reported well yields are generally low	Water is probably soft and low in dissolved solids.
ORDOVICIAN	REEDSVILLE FORMATION	Dark-gray, greenish-gray, and olive-gray shale, some siltstone and a few sandstone layers near the top	Reported well yields range from 1 to 50 gal/min; the median for domestic wells is 12 gal/min and the median for nondomestic wells is 20 gal/min.	Water is moderately hard and relatively low in dissolved solids; about half the wells produce water high in iron and manganese; excessive hydrogen sulfide is an occasional problem.
ORDOVICIAN	COBURN FORMATION THROUGH NEALMONT FORMATION, UNDIVIDED BENNER FORMATION THROUGH LOYSBURG FORMATION, UNDIVIDED CHAMBERSBURG FORMATION ST. PAUL GROUP	Coburn Formation—Medium-gray limestone. Salona Formation—Shaly limestone and calcareous shale. Nealmont Formation—Medium gray, fossiliferous limestone. Benner Formation—Gray, thick-bedded limestone. Snyder Formation—Light- to medium-gray limestone. Hatter Formation—Medium-gray, argillaceous limestone. Loysburg Formation—Light- to medium-gray, medium-bedded limestone overlying laminated, alternating limestone and dolomite. Chambersburg Formation—Dark-gray, cobbly, argillaceous limestone. St. Paul Group—Very finely crystalline limestone.	Reported yields of 25 domestic wells range from 1 to 25 gal/min; the median is 6 gal/min.	Water is hard and moderately high in dissolved solids.
ORDOVICIAN	BELLEFONTE FORMATION AXEMANN FORMATION	Bellefonte Formation—Medium- to thick-bedded, gray dolomite and minor amounts of chert and sandstone. Axemann Formation—Mainly limestone and a few layers of dolomite.	Reported well yields range between 1 and 250 gal/min; the medians for domestic and nondomestic wells are 10 and 30 gal/min, respectively.	Water is very hard and high in dissolved solids.
ORDOVICIAN	NITTANY FORMATION STONEHENGE/LARKE FORMATION	Nittany Formation—Medium- to dark-gray, thick-bedded dolomite containing chert and siliceous oolites. Stonehenge Formation—Medium-gray, medium-bedded to laminated, oolitic limestone. Larke Formation—Medium- to dark-gray, coarsely crystalline dolomite (lateral equivalent of Stonehenge Formation).	Reported well yields range from 3 to 150 gal/min; the median yields for domestic and nondomestic wells are 15 and 26 gal/min, respectively.	Water is very hard and moderately high in dissolved solids.
CAMBRIAN	GATESBURG FORMATION: MINES MEMBER LOWER MEMBERS	Gray dolomite containing siliceous "oolites" and chert overlying cyclic repetitions of sandstone and dolomite; laminated to massive limestone and dolomite; cyclic repetitions of sandstone and dolomite; and thick-bedded crystalline dolomite.	Reported well yields range from 1 to 300 gal/min; the median for domestic wells is 9 gal/min; all four inventoried nondomestic wells have yields greater than 100 gal/min.	Water is very hard and relatively high in dissolved solids.
CAMBRIAN	WARRIOR FORMATION PLEASANT HILL FORMATION WAYNESBORO FORMATION	Warrior Formation—Gray, thin- to medium-bedded limestone interbedded with dolomite and some sandstone. Pleasant Hill Formation—Gray, thin-bedded, argillaceous limestone interbedded with shale, siltstone, and sandstone. Waynesboro Formation—Greenish-gray and grayish-purple shale interbedded with greenish gray sandstone and conglomerate.	Limited data; reported well yields are small to moderate.	Water is probably hard to very hard and moderately high in dissolved solids.

SYMBOLS

Contact
Includes approximately located and inferred contacts.

Fault
Dashed where approximate.

Water well and county well number
In concealed areas, only selected wells are shown.

Water well for which there is a chemical analysis, and county well number

Spring and county spring number

Stream gaging station and station number

MAP OF THE JUNIATA RIVER BASIN, PENNSYLVANIA,
ING THE LOCATIONS OF WELLS AND SPRINGS

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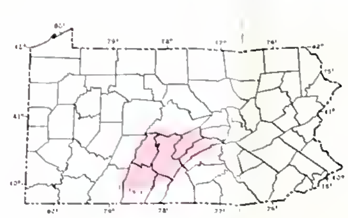

LOCATION OF AREA

Geology and base map from Berg and others (1980).
Hydrology by L. E. Taylor, W. H. Werkheiser, N. S. duPont, and M. L. Kriz, 1980-81

John G. Kuchinski, Cartographer